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BURUNDI LEGUME/BEAN VALUE CHAIN RAPID ANALYSIS

FINAL REPORT

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Agricultural Program Knowledge Support

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ACRONYMS

ASARECA	Association for Agriculture Research in East and Central Africa
CAADP	Comprehensive African Agriculture Development Plan
BAP	Burundi Agribusiness Program
BIF	Burundi franc
CAPAD	The Confederation of Agricultural Producer Associations for Development
CECM	Caisse d'Epargne et Crédit Mutuelle
CEPGL	Economic Community for Great Lakes Countries
CNTA	Centre Nationale de Technologie Agro-Alimentaire
COMESA	Common Market for Eastern and Southern Africa
CRS	Catholic Relief Services
DPAE	Direction Provinciale de l'Agriculture et de l'Élevage
DRC	Democratic Republic of Congo
EAC	East African Community
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
GAP	Good Agronomic Practices
GDP	Gross Domestic Product
GHI	Global Health Initiative
GOB	Government of Burundi
HACCP	Hazard Analysis and Critical Control Point
IMF	International Monetary Fund
INADES	Institut Africain du Développement Economique et Sociale
IQC	Indefinite Quantity Contract
ISABU	Institut de Recherche Agronomique du Burundi
MFI	Micro-Finance Institution
MINAGRIE	Ministère de l'Agriculture
MYAP	Multi-Year Assistance Program
NGO	Non-Governmental Organization
OTF	On the Frontier
PABRA	Pan African Bean Research Alliance
PM2A	Preventing Malnutrition in Children under two Approach
PRODEFI	Programme de Developpement des Filieres
PEG	Promoting Economic Growth
PO	Producer Organization
PP/S	Participants per Session
SCEP	Service Conseil aux Efforts de Privatisation
SCP	Soil Conservation Practices
SOW	Scope of work
USD	US Dollar
USG	US Government
VC	Value Chain
WB	World Bank

EXECUTIVE SUMMARY

USAID asked Weidemann Associates to analyze the legume/bean value chain (LBVC) and make recommendations for USAID to consider in accelerating the development of the LBVC in Burundi as part of its rural development and poverty and hunger alleviation strategies. This document reports on the facts and conclusions of that analysis.

Context

Burundi is poor. It is ranked 185 out of 187 countries on the 2011 UNDP Human Development Index (HDI). It has a gross domestic product of $110 per capita and a gross national income of $368 per capita. Although it regained peace and stability in the last few years, Burundi is still struggling to achieve sustained economic growth. Domestic and foreign investment is low compared to other post-conflict countries. The economy depends on the agriculture sector, which is mainly subsistence-driven and has low productivity. Despite the difficulties, Burundi has cleared a path for economic growth. Recent policy reforms and strategies indicate a push for sustainable economic development. Among the Burundi government initiatives is a budget increase for the agriculture sector to 6.2 percent. This is a substantial increase, but is still far short of the 10 percent budgetary share in the Maputo recommendation.

Agricultural Challenges

Food insecurity is widespread and a large part of the population is undernourished. According to UNDP's 2011 Human Development report, 62 percent of Burundi's population is undernourished, compared to 27 percent on average for Sub-Saharan African countries. The driving forces of the sector are food crops, mainly beans, sweet potatoes, bananas, cassava, Irish potatoes, sorghum, rice, and maize.

Small farms, often 0.5 hectares or less, have difficulty getting the right inputs to significantly increase productivity or achieve full marketing income potential. In addition, there are issues of land tenure rights. Women do not have legal rights to inherit or own or land. They have limited economic ability to rent land or to access tools, inputs and techniques.

Poor infrastructure leads to high costs that makes Burundi's agricultural products less competitive in domestic, regional and international markets. Land degradation and decline of soil fertility are affecting productivity. Because of lack of access to productivity-enhancing inputs including fertilizer and improved tools and techniques, the productivity of the Burundi farmer continues to be low. In 2012, the national food deficit is estimated to be 40 percent (a cereal equivalent of 400,000 – 500,000 tons).

Although the Burundi government farmer extension service has the organizational structure and personnel to help farmers, it does not have enough money, materials, or equipment.

The Bean Subsector

Beans are an essential protein and the most important staple food of Burundians of all income levels. If supplies and income were sufficient, a study shows that Burundians would increase bean consumption

from 32 kilograms per person per year to 60 kilograms. More than 90 percent of Burundi farmers are engaged in bean production. A typical farm cultivation area for beans is 0.25 hectares. Production of beans decreased until 2008 when the Burundi government made a great effort to intervene in the sector. Production has stabilized since and is showing small increases in the last three years.

Since the 1980s, Burundi's population has doubled but bean production has not kept pace. Rural families are forced to consume less so that they can sell a little surplus to generate some needed cash. The frequency of eating beans has been drastically reduced in the poorest rural households, with a negative impact on nutrition and health.

There are two main types of beans grown in Burundi: hanging and common (non-climbing) beans. Many farmers could double or triple yields by replacing common bean varieties with climbing varieties. Many farmers, however, are unable to access these varieties or fertilizer. ISABU (Institut de Recherche Agronomique du Burundi), the seed research unit of Burundi's Ministry of Agriculture, is the only institution that carries out seed research and develops breeder seed. It supplies pre-basic seeds to seed multipliers. The public agricultural extension service – DPAE, is engaged in seed multiplication and distribution with support from FAO and NGOs. ISABU needs to increase the supply of pre-basic seed (now 5-7 tons per year) and DPAE has to intensify its seed multiplication to increase the amount of basic and commercial seed to a level that would make a significant difference in national yield, drought tolerance and disease resistance. The absence of a network of storage facilities and distribution outlets, along with effective extension services is compounding the problem of seeds in Burundi. It could also create jobs or increase incomes of seed producers.

For farmers, 90 percent of bean seeds are saved from the previous season, are from neighbors, or are low yield seeds from the local market. The public extension system in rural areas (DPAEs) does not have the resources to multiply the seeds in an effective and timely manner. Seed production collaborators such as community groups, associations and seed farmers are not given the right training and the resources needed to produce quality seeds. Farmers also need to test seeds before committing resources to switch to a new seed variety.

The majority of farmers do not use the recommended amount of chemical or organic fertilizer. Many farmers do not use fertilizers at all. In Muyinga, farmers reported they use about 30 percent of the recommended fertilizer. If farmers used recommended amounts, total effective demand for chemical fertilizer for beans would be 20,000-25,000 tons. Government imports of fertilizer for all crops have recently increased to 10,000 metric tons per year but remain grossly insufficient. The Burundi government, with assistance from the Netherlands, is about to launch a program for fertilizer imports, providing vouchers for fertilizer subsidies for food crops and seeking to create a network of private input suppliers. This activity could be leveraged to complement a USAID legume/bean value chain development.

FAO and other donors have been working with the Ministry of Agriculture and with public and private seed multipliers for a number of years to improve yields on beans and other crops. A number of NGOs with donor funding are working with bean farmers to educate them about the benefits of improved seeds and fertilizer, and help with production and marketing. One NGO has focused on teaching families to use existing farm resources to improve nutrition. Several international NGOs, working in limited areas, work

with small farmer associations on hillsides helping them develop production, storage and marketing programs for their members and training them in business and organizational management. All the NGOs the evaluation team met indicated that they are slowly changing their philosophy of 'charity giving' to one of 'helping farmers produce more' hence reducing dependency.

Farmers can increase their revenue from beans by roughly 40 percent by producing and selling single varieties of beans instead of mixed varieties. And by learning storage techniques to delay marketing past the main harvest season they could increase their net revenues by about 30 percent, even after paying monthly storage fees. Credit facilities that that would help farm families introduce improved and modern inputs are rare. There is a network of large private traders that buys beans from Burundian farmers and their organizations and also buys beans from Tanzania, Rwanda and Uganda. Farmers could increase returns by improving their marketing practices and infrastructure through organizations at the local level. Farmers can cooperate to produce a single variety of beans, increasing the sales value by about 40 percent. If they store for a couple of months past the main harvest season, sales value would increase by roughly 30 percent. The large traders are centered in Bujumbura, where they can respond to government contracts and some of them deal in other bulk food products as well. One of the two large traders met by the team said that he has more than 20 competitors in the wholesale bean trade.

Possibilities for women bean producers looking to increase incomes through donor support include increasing the use of livestock and new techniques to save fuel required for cooking beans. To reduce gender-based violence, USAID should develop strategies to support women farmers with consciousness awareness activities, including radio and school initiatives. USAID could also partner with micro-credit institutions to help farmers and particularly women's production and marketing groups. Several NGOs are mentioned in this report that could be viable partners for resource management and for gender programs.

The following are among the key opportunities and potential initiatives linked to the bean sector:

- Implement food-based community nutrition education and cooking demonstrations to encourage the use of locally produced foods including beans.
- Maximize the use of beans through improved food preservation and processing techniques, and make it accessible to vulnerable households.
- Collaborate with community health worker/agricultural extension agents to promote nutrition and behavior change.
- Work nationally and locally to improve fortification techniques and access to fortified foods in areas with significant micronutrient deficiencies. Bean flour may add value to existing flour mixes for better nutrition for young children.
- The biggest opportunity is for farmers to adopt climbing bean varieties, which could double or triple yields.
- Other opportunities are for farmer associations or groups of associations to cooperate with large traders to produce and market single variety beans, worth perhaps 40 percent more than mixed beans.
- Implementing partners including NGOs and small and medium enterprises can work with farm groups to find cheaper or better alternatives to poles for climbing beans (bushes, strings, shorter poles, etc.).

- Small farmer associations (sometimes in groups of 30 or so) have been forming over the past decade that can help with education, pooled work to increase value addition, education and improved marketing.
- NGOs and the private sector can help farmer organizations provide inputs to farmers.
- Warehouse receipts or other savings or credit systems can help farmers wait for higher prices that are typical after the main marketing season.
- Some large traders have linkages to farmer supplier networks and help farmers market beans.
- Burundi has a large deficit in production of beans and thus the market in Burundi and in neighboring countries can absorb any surplus the farmers are likely to produce. A study shows that should there be increased production (which would also effectively increase the incomes of farmers), consumption of beans could increase from the current 32kg/person/year to the desired level of 60kg.person/year. There are also export possibilities in Congo, Uganda and Kenya, particularly if a tripling of yields for some farmers changing to climbing beans results in lower market prices.
- Some women have been organizing in small groups for cooperative production, marketing or credit activities. Other farmers' associations are organizing to provide storage facilities, help with training on production, postharvest handling and marketing, and in providing input supplies including seeds, fertilizer and insecticides.
- Organized groups make it much easier to target small farmers and train them in agricultural techniques, processing techniques, nutrition, business skills development and marketing, organizational development and networking with similar groups or to develop new income generating activities.
- Single variety bean production and marketing (instead of mixed beans) can increase farmer sales value by about 40 percent.
- Storage of beans in rural areas for two or three months past the main harvest season (truckload quantities of 25 to 60 MT) can increase farmer sale prices by about 30 percent. Some such facilities exist now; some were built with help from several NGO's. With better farmer organizations and modest assistance from a donor program, other storage facilities could be built by cooperatives based in communes, serving a number of hillsides. Current farmer storage costs in existing storehouses, paid in kind, are reported as about 1 percent per month or perhaps 3 percent for three months for a gain of roughly 30 percent in market prices by delaying marketing for two or three months.
- Small scale or large scale microfinance groups can help farmers get needed credit to buy inputs or to delay marketing of their crops while waiting for market prices to increase. Microfinance charges are typically 2 to 3 percent per month, but in some cases of small credit cooperatives using member savings, loan rates can be lower (e.g. well below bank rates reported by one small credit cooperative). With doubling or tripling of yields for improved seeds of climbing beans, 40 percent higher price for a single color bean marketed, 30 percent increase for delaying marketing two or three months, the returns could substantially exceed the credit cost. Microcredit groups can also help promote individual and group savings and help provide record keeping services.
- Because of the need for strong cooperation and trust, most of the positive changes will require working to develop the capacity of small local organizations organized on hillsides, and perhaps joining forces with other small groups with similar interests.

OVERVIEW OF THE CURRENT MACROECONOMIC ENVIRONMENT

The Land and the People

Burundi is land-locked covering of 27,834 square kilometers, of which 9,899 square kilometers are arable. Bujumbura, the capital, is located about 1,166 kilometers from Dar es Salaam, Tanzania, the nearest port, and 1,300 kilometers from Mombasa, Kenya. The preferred port is Mombasa because of better roads and facilities, but a transporter has to pass through three countries (Rwanda, Uganda and Kenya) to reach it. Bujumbura is located at the northern edge of Lake Tanganyika which borders the Western part of Burundi. Seventy five percent of the farmland is owned by families through inheritance; about 20 percent is rented.

Burundi's population is about 8.4 million (2011 World Bank report) growing at an average rate of about 2.8 percent per year. It is the second most densely populated country in the world with more than 300 people per square kilometer. In some regions (mostly in the north), the population density is 500 to 600 people per square kilometer. More than 90 percent of the population lives in rural areas where women account for more than 51 percent of the population. The average size of the family is 5.3 people. About 80 percent of the families are headed by men while 15-20 percent are headed by women, mostly widowers. The average literacy rate (basic reading and writing) is about 54 percent with men at 65 percent and women at 21 percent. The 2011 UNDP Human Development report indicates life expectancy in Burundi is 50.4 years.

The Economy

Burundi is ranked 185 out of 187 countries on the 2011 UNDP Human Development Index (HDI).The HDI report also indicates Burundi has one of the lowest per capita incomes – a gross domestic product of $110 per capita, and a gross national income of $368 per capita. With a poverty index of 67 percent, Burundi is one of the three poorest countries in the world. Starting with a low developmental base, the country suffered from a 13-year war and a four year economic embargo that devastated the economy and destroyed the infrastructure. Although it regained peace and stability in the last few years, Burundi is still struggling to find sustained economic growth. Domestic and foreign investment is low compared to other post-conflict countries. There is no growth in productivity and output. The economy mainly depends on the agriculture sector, which is mainly subsistence-based with low productivity. The export sector is still undiversified leading to vulnerability to any internal and external shocks including bad weather, international price changes, transport cost and unanticipated trade barriers. Coffee accounts for 70-80 percent of the export revenue. Burundi is one of the few countries where more than 50 percent of its government's total revenue comes from foreign aid. A 2011 World Bank report mentions that grants represent about 57 percent of the total revenue of Burundi.

While the country is dependent on foreign aid, its government expenditure has been rising significantly in recent years. The World Bank report indicates that expenditure has increased from 27.2 percent of GDP in 2001 to 44.1 percent of GDP in 2008. The rise in expenditures added to international price hikes, has raised the rate of inflation in recent years. The current inflation rate is estimated to be more than 20

percent. During the last few years, the Burundi franc is getting weaker and weaker. In 2012 alone, the currency has devalued by more 20 percent. At the beginning of the year $1 was worth 1,230 Burundi francs. On September 15, 2012), it was 1,500 Burundi francs. Information from the banking sector indicates that the currency will depreciate more since there is no sign of reversing the declining trend of Burundi's foreign exchange reserves. With this volatility of prices and currency, it would be difficult to attract investment, particularly foreign investment.

Despite the difficulties, Burundi has cleared a path for economic growth. Recent policy reforms and strategies indicate a push toward sustainable economic development. To lead its socio-economic development efforts, the Burundi government adopted a new Poverty Reduction Strategy Plan and launched an ambitious five-year National Agricultural Investment Plan (NAIP) early in 2012 that operationalizes NEPAD's Comprehensive African Agriculture Development Plan (CAADP). The Burundi government has also initiated a series of policy reforms including the enactment of new land and water codes as well as improvements to the business enabling environment that seek to significantly increase investments in the agriculture sector. Privatization of publicly owned coffee enterprises is one of the reforms that would increase foreign and domestic investment in agriculture.

With regard to regional cooperation, Burundi occupies a strategic location which led it to be a member of several regional political and economic bodies including the East African Community (EAC), Common Market for the Eastern and Southern Africa (COMESA), Economic Community for the Great Lakes Countries (CEPGL), the Nile Basin Initiative (NBI), the International Conference for The Great Lakes Region (ICGLR), and the Free Trade Area for Eastern and Southern Africa. Through effective membership, such cooperation would lead the country to be a center of economic growth by partnering with countries such as Rwanda, Tanzania, Uganda, Kenya and the Democratic Republic of Congo (DRC).

The Agriculture Sector

Burundi's economy is mainly rural and depends on the agriculture sector, which, since 2005 has accounted for nearly 50 percent of GDP. About 89 percent of the population makes a livelihood through agriculture. The sector provides 95 percent of the food supply and raw materials and more than 90 percent of export earnings. Burundian agriculture is mainly subsistence-based, undiversified, and traditional. Despite increasing demand from population growth, productivity is low and has barely improved during the past four decades. Food insecurity is widespread, and a large part of the population is undernourished. According to UNDP's 2011 Human Development report, 62 percent of Burundi's population is undernourished, compared to 27 percent on average for Sub-Saharan African countries.

The main driving forces of the sector are food crops, mainly beans, sweet potatoes, bananas, cassava, Irish potatoes, sorghum, rice, and maize. Food crops account for about 81 percent of agricultural GDP, followed by livestock (15 percent), and export crops (4 percent).

The main cash crops include coffee, tea, cotton, palm oil, and sugar cane. The first three are the main sources of export revenues. Coffee is the most important export commodity, accounting for 60-80 percent of total export earnings, followed by tea, generating 10-15 percent of total export revenue.

Because of the effect of the war on a) the population, b) the land, c) the infrastructure and d) institutions, the productivity of the agriculture sector has not only been low but has also been declining since the early 1990s. Despite relative peace and stability in the last five years, Burundi's transition to recovery and sustainable development has been slow. Unless the investment climate becomes increasingly favorable, the private sector (foreign and domestic) is less likely to invest with full confidence and vigor. It requires, first, for the Burundi government to develop and implement a comprehensive reform of the agriculture sector and significantly invest in agricultural institutions, infrastructures and human development. The productivity of the food crops subsector urgently needs to be improved to increase food security and improve the nutrition of the population. The same applies to export crops (mainly coffee), which is suffering from low production volumes and low quality. The Burundi government has initiated a number of policies and strategies to improve the performance of the agriculture sector. The National Agricultural Investment Plan (NAIP) is one of the Burundi government's policy frameworks that operationalize investments necessary for the implementation of the national agricultural strategy.

Among the initiations taken by the Burundi government is increasing the budget for the agriculture sector. While the contribution of agriculture to the GDP is between 30 and 50 percent, employing more than 90 percent of the population, agriculture did not receive its fair share of the budget. Over the last five decades, the annual budget allocated for this sector was less than 2 percent of the total budget. It is only since 2008 that the Government decided to increase the share of the sector to 4.2 percent and 3.6 percent in 2009. In 2011 the Government made a great stride to increase the budget for the sector to 6.2 percent. The Burundi government's effort is in line with the AU's Maputo recommendation but remains far short from the 10 percent share.

Table 1: Evolution of the Budget for the Ministry of Agriculture and Livestock ('000 Burundi francs)

Indicator	2005	2006	2007	2008	2009	2010	2011
Budget	2,283,851	4,289,168	6,390,024	15,607,316	16,862,770	18,037,578	43,220,679
% Increase		87	49	144	8	7	140

In addition to the Government budget, Burundi gets significant support from various partners including international and regional organizations, international and bilateral donors, international and regional financial institutions, NGOs, and projects.

The share of the public sector in development investments is estimated to be about 75 percent between 2001 and 2004. Domestic private investments have just resumed, but they remain poor, reaching an average of 8 percent of the GDP between 2005 and 2008. Foreign direct investments represent less than 1 percent of the GDP.

Under the framework of NAIP, the mission of the agriculture sector is to insure quantity and quality and food security for all Burundians by transforming agriculture from subsistence to business-oriented family enterprise generating sustained increases in household revenue, and managing the natural resources and environment. Key challenges that Burundi has to face up and tackle to achieve this mission are:

Small farm size: As the population grows, the size of the family farm gets smaller and smaller. A Burundian farm family works on an area that is less than 0.5 hectares. It is on this land that the family grows a range of crops including food and export crops (mainly coffee). Each crop competes for family labor resources and other essential inputs such as seeds, fertilizer, pesticides, tools, and storage. With a farm size as small as 0.5 hectares, it is difficult to significantly increase productivity since the advantage of economies of scale (from the use of inputs) would be weak in smaller sizes than in larger ones – hence discouraging farmers from using inputs in small farm sizes. In addition, there are land related conflicts Because of uncertainty in land tenure rights. Women do not have legal rights to own land since family land cannot be transferred to daughters.

Weak Purchasing Power: The immediate cause of low productivity is lack of access and use of improved and modern production tools, inputs and techniques. The underlying reason is lack of disposable income that farmers do not have the economic means to acquire these modern inputs. Moreover, there are no economic incentives such as credit facilities that would help farm families introduce improved and modern inputs.

Poor Extension Services: Although the Burundi government has the organizational structure and the accompanying staff, the public extension system does not have the required materials, tools and equipment to provide services to farmers. In short, there is no budget for capital expenditures and operational expenses. Extension agents do not have the means to reach farmers or provide an effective extension service. Furthermore, weak coordination and lack of harmonization between research-extension-projects is hampering transfer of knowledge and skills.

Poor Infrastructure: Burundi is experiencing a problematic development process because of inadequate and poor infrastructure. The poor state electricity, roads, market centers/outlets, storage facilities, and transport and handling equipment and facilities are obstacles to improving production as well as marketing. Poor and inefficient infrastructure leads to excessive costs that make Burundi's agricultural products less competitive in domestic, regional and international markets – hence hurting Burundi's rural population who make up 90 percent of the population.

Weak and inadequate input and output marketing system: The distribution and marketing of inputs and outputs is not well organized or managed. Input distribution and food marketing is underdeveloped since farmers lack an organized cooperative that works for their interest and aspirations. Second, the private sector is still too weak to establish effective and adequate sales and distribution outlets for agricultural inputs as well as outputs. Burundi farmers are poorly organized to have little access to markets or market information. Because of limited information on prices, farmers continue to be exploited by middlemen who pay much less than the going market prices.

Agronomic Constraints: Land degradation and decline of soil fertility are affecting the productivity of agricultural products. Productivity among Burundi farmers remains low because of a lack of access to productivity enhancing inputs including fertilizer and improved tools and techniques. Cow manure is becoming rare since no re-stocking of cattle has been done since the end of the 13 year civil war when millions of cattle were displaced and killed.

Climatic Constraints: Although not severe, volatility in magnitude and distribution of rainfall affects production of agricultural crops. For crops such as beans, maize and sorghum a short dry spell can significantly affect the volume of production. In recent years, this climate change has affected food production so that the rate of annual food deficit has been increasing. In 2012, the food deficit is estimated to be 40 percent as reported by FAO-WFP food availability survey.

THE BEAN SUBSECTOR - ROLE AND IMPORTANCE

Beans are the most important staple food and crucial diet of all Burundians. Beans contribute significantly to the livelihood of Burundi's rural population. Beans are grown in all the 17 provinces of Burundi. More than 90 percent of Burundi farmers are engaged in production of beans (WFP, 2008), a significant proportion that certifies a great role beans play in rural households. Coming second after beans is sweet potato that is cultivated by 60-70 percent of farmers. According to the National Agricultural Survey of 2008, beans are grown in the largest proportion of arable land accounting for about 250,000 hectares of land followed by bananas (213,000 ha), roots and tubers (211,000 ha), and cereals (206,000ha). In terms of production, beans are ranked fourth after bananas, roots and tubers and cereals. During the 1980s when the population was half of todays, the beans surplus used to be 40-50 percent of total production. It was bringing significant income to farmers. Over the last three decades no improvements were made to increase production. The situation worsened during the 1992-2005 war when agricultural productivity declined because of a lack of any investment in the sector. Production of beans decreased until 2008 when the Burundi government made a great effort to intervene in the sector with increased will and budget. Production has stabilized since and is showing signs of small increases in the last three years.

Since the 1980s Burundi's population has doubled but bean production has stayed the same. The beans surplus is so insignificant that rural families are forced to consume less so that they can save a little surplus to generate some needed cash. Beans are now consumed mostly by relatively "rich" rural households, while the poor are left with "inferior" roots and tubers. The frequency of eating beans has drastically been reduced in rural poor households, hence having a negative effect on nutritional level of rural households. Beans' contribution to rural income has been declining since much of what is produced is consumed leaving a negligible surplus for sale. A number of surveys including IFAD/Prodefi estimated that 15-25 percent of beans are sold (30,000-50,000 tons a year). A significant portion of this is re-bought by farmers for seeds. Shortages are met by informal trade from neighboring countries, mostly from Tanzania.

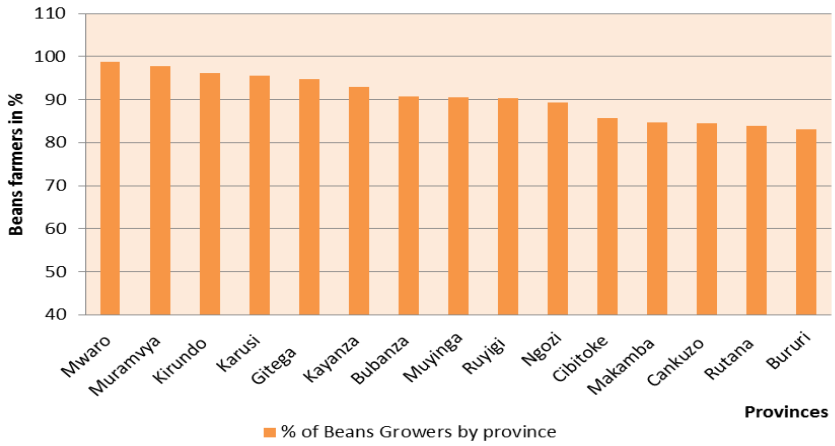
Production

Overall Production

Beans are grown in eleven agro-ecological zones across low, medium and high altitudes starting from as low as 774masl to as high as 2670masl. Beans are mostly grown in *Buyenzi* and *Kirimiro* agro-ecological zones both found in the North of Burundi. About 62 percent of Burundi's beans are grown in Ngozi, Gitega, Kirundo, Kayanza and Muyinga. As shown in the tables below, Burundi has witnessed declining production trends because of various constraints including climate change and reduced use of inputs. There are two main types of beans grown in Burundi: hanging and common (non-climbing) beans.

Hanging beans are mostly grown in mid and high altitude, while common beans, also known as *bush* bean, are grown in all altitudes. Hanging bean is grown under monoculture while 70 percent of common beans are grown under intercropping system mixed with bananas, sweet potato, cassava, or maize. Adaptive research results have shown that yields of hanging beans are 3 to 5 times higher than the common beans because of intensification activities involved, including supplying staking materials for holding the hanging beans. Prices of hanging beans are also higher by an average of 25-30 percent since the produce is in one color mostly the preferred yellow and red bean color. The unique color beans are mostly consumed in big towns such as Bujumbura while the mixed common beans are consumed by rural households because of their affordable prices and taste that rural households are used to.

Figure 1: Percentage of Bean Growers by Province

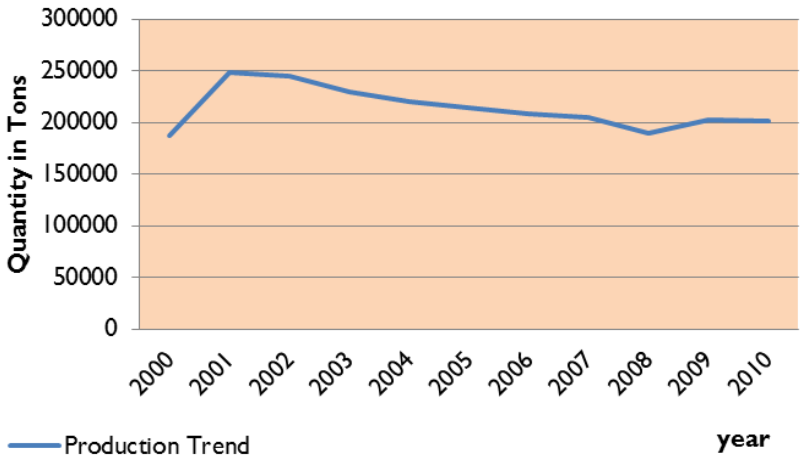


Most farmers using traditional common varieties are not using improved seed or fertilizer. The average size of a beans farm is 0.25 hectares. The average yield for the traditional common beans ranges between 500-800 kilograms per hectare depending on soils type and amount of rainfall. In contrast, climbing beans give 2 - 2.5 kilograms per hectare when improved varieties and fertilizer are used. Climbing beans also require staking materials which is costly both in labor and material. According to an IFDC report, the most highly recommended staking material is a 3-meter pole for each climbing bean each costing 30 Burundi francs. The poles are expected to last three to four years. For a farmer with a quarter hectare of beans the cost would be roughly 200,000 Burundi francs (about $133) – a substantial sum for a small farmer whose purchasing power is weak. Cheaper alternatives may be available with shorter poles, such as using corn stalks or growing a bush tree next to them where the vines can extend or using strings for the vines to climb. The team heard several times from some farmers that they would not easily switch to climbing beans because of the difficulty of getting the poles.

Table 2: Bean Production by Province, 2000-2010 (tons)

Province	2000	2001	2002	2003	2005	2006	2007	2008	2009	2010	Average	%
Ngozi	15,139	34,982	34,577	32,528	30,440	29,134	29,463	30,040	32,251	31,715	30,027	14%
Gitega	29,255	33,484	32,909	30,423	28,738	27,901	27,008	22,705	24,724	24,741	28,189	13%
Kirundo	17,472	26,618	26,195	24,924	26,610	25,725	26,319	27,287	31,521	32,606	26,528	12%
Kayanza	24,797	30,070	29,854	27,795	25,517	25,101	23,812	22,357	23,550	23,248	25,610	12%
Muyinga	17,261	23,245	23,084	22,359	22,458	23,339	23,533	22,457	24,856	24,332	22,692	11%
Karuzi	17,911	21,315	21,212	20,163	19,532	19,250	18,832	17,198	17,489	17,381	19,028	9%
Muramvya	10,032	16,704	16,489	15,960	13,310	13,424	12,150	12,289	13,075	12,911	13,634	6%
Ruyigi	8,457	10,630	10,140	8,889	8,014	7,092	7,135	5,499	5,087	4,674	7,562	4%
Mwaro	8,522	8,088	7,963	7,616	6,603	5,758	5,722	5,223	5,334	5,355	6,618	3%
Bururi	7,261	8,043	7,914	7,365	6,271	5,789	5,762	5,193	5,398	5,335	6,433	3%
Cankuzo	6,670	7,926	7,817	7,263	5,689	5,666	5,556	3,282	3,597	3,344	5,681	3%
Makamba	6,277	6,800	6,692	5,961	5,177	5,027	4,741	4,322	4,047	4,106	5,315	2%
Bubanza	5,849	6,765	6,622	6,080	4,612	5,081	4,780	3,846	3,748	3,726	5,111	2%
Cibitoke	5,388	6,218	6,199	5,736	5,344	5,003	4,887	3,746	3,859	3,827	5,021	2%
Rutana	4,130	4,732	4,545	4,243	3,595	3,335	3,214	2,198	2,275	2,150	3,442	2%
Buja rural	2,996	3,298	3,077	2,936	2,296	2,326	2,282	2,019	2,123	2,100	2,545	1%
Total	187,417	248,918	245,289	230,241	214,206	208,951	205,196	189,661	202,934	201,551	213,436	100%

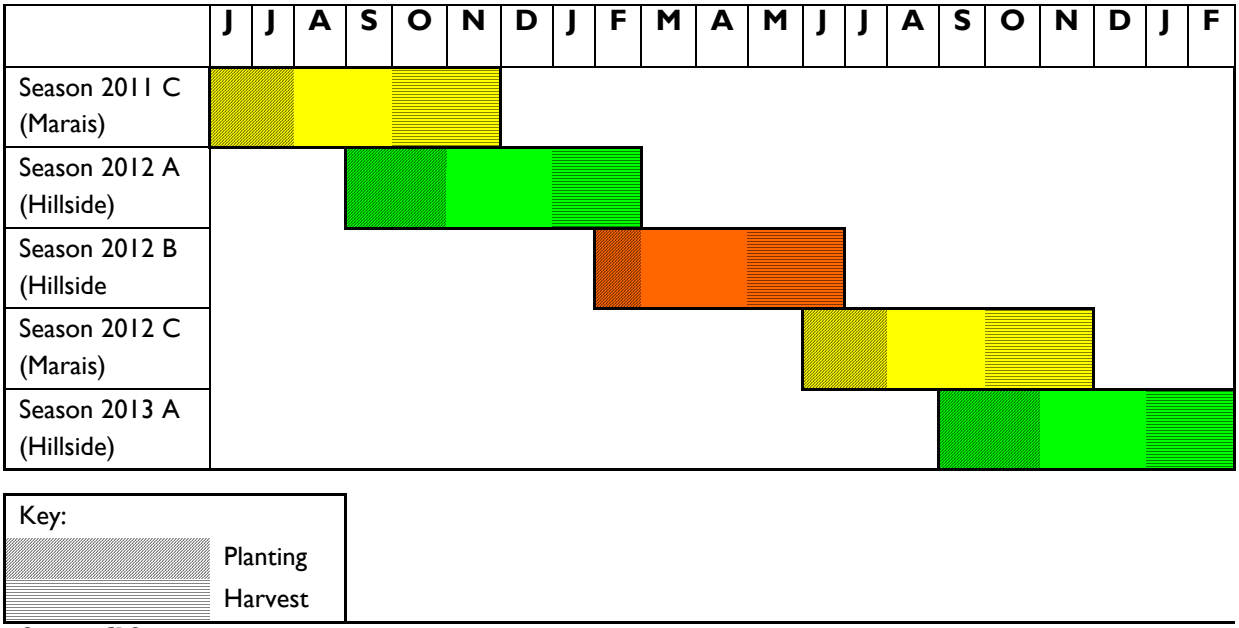
Figure 2: Bean Production, 2000-2010 (tons)



Cropping Season

Burundi is endowed with favorable agro climatic conditions that suit production of beans. In Burundi, beans are grown in three cropping seasons within a year. They are commonly called as: Season A (Sept-Jan); Season B (Feb-June); Season C (June-Oct). Season A and Season B are allotted for hillside bean farming, while Season C is for bean cultivation on marshlands (marais). The following table demonstrates Burundi's cropping calendar for beans.

Figure 3: Burundi Cropping Calendar: Beans



Source: CRS report

In terms of production estimates by seasons, the WFP 2008 Household survey indicates about 50 percent of Burundi's beans are produced during season B (Feb-June) when the amount and distribution of rainfall is more favorable to growing beans. Season A (Sept-June) produces about 40 percent, while season C (June-Oct) contributes about 10 percent of Burundi's bean production.

From planting to harvest, the vegetative cycle for traditional common beans is 70-90 days while for climbing beans the cycle is much longer - 100-150 days. Long cycles are not favored by farmers since it competes with growing other crops and takes more labor time. The optimum temperature for good bean germination is 25-300 C. For excellent plant growth and development, the suitable temperature is 16-250 C. Beans can grow in different types of soil with good drainage. They are sensitive to highly acidic soils, and do less well in laterite soils. They can grow well in swampland in the short dry season when the soil is moist, the water is drained, and there is no flooding.

One NGO promoting beans (CONCERN) said that climbing varieties are suitable only above 1,500 meters largely because of temperature considerations, but other NGOs (CRS, IFDC) said that there are climbing or semi-climbing varieties that will grow at any altitude in Burundi. When we asked the Research Institute ISABU, it confirmed CONCERN's statement that hanging beans are suitable in mid and high altitudes. Climbing beans are not appropriate in the marshlands (marais) since they take too long. Some contacts expressed concern that climate change may be changing growing seasons because of erratic rainfall and shortened period of rainfall trends in the last 10 years.

Varieties

There are several varieties of beans in Burundi. They are categorized in three types: Traditional (common) variety; Semi-Climbing variety; Climbing variety. Most farmers growing the traditional

common beans use traditional varieties mostly kept by farmers or bought from local markets. They are mostly mixed. In recent years, however, improved varieties, with one color, are diffused and some are gaining popularity. For example, Dore du Kirundo (also known as the Golden Kirundo) is popular in all altitudes. Another variety that is getting increased popularity in all regions is MORE which has a yellow color and preferred by consumers. In relatively dry areas such as Bugesera, the Katimani (Kenya) non climbing varieties are doing well. Some of these are: Katbi 1 (yellow), Katbi 9 (red), Katx 69 (red Kalima). *Inamunhire* (yellowish red) is also one of the popular common bean varieties.

For climbing beans, there are a good number of varieties that are multiplied and diffused. Varieties such as *Muhondo, Vuninkingi, Bishaza* (AND 10), and G13607 (Red) are being multiplied and used. *Mukungugu* and *Musongo* are two semi-climbing bean varieties that are getting increased popularity mainly in mid altitude zones. The following table provides an indication of what type and varieties are grown in the three main agro-ecologies:

Table 3: Bean Varieties in Burundi by Altitude

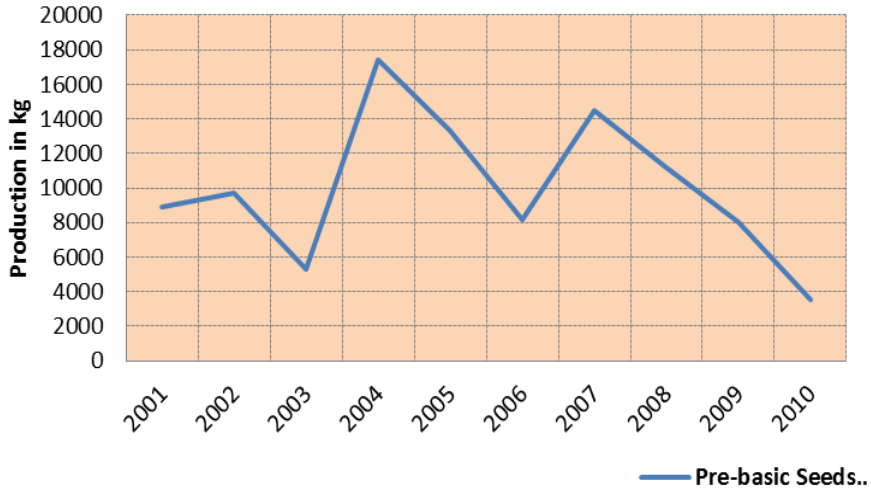
Bean Varieties	High Altitude	Mid-Altitude	Low Altitude
Climbing Bean	Muhondo Vuninkingi AND 10 – Bishaza G13607 - Red	Vuninkingi	Vuninkingi
Semi-Climbing Bean	Mukungugux MLB122 - Musongo	Mukungugu MLB122 - Musongo	
Bush Beans	MORE -Yellow	MORE -Yellow	Katbi 9 – Redx Katx 69 – Red kalmia Izo 02 – Inamunihire Dore du Kirundo MORE -yellow

Inputs: Bean Seeds

A PABRA-CIAT (Pan African Bean Research Alliance) 2010 Baseline Survey reported "only 10 percent of seeds in Burundi come from research institutions, agricultural projects, NGOs and small scale seed producers". ISABU is the only institution that carries out seed research and that develops breeder seed and supplies pre-basic seed to seed multipliers. ISABU is ready to release the pre-basic seed to anyone who is interested to multiply and distribute seed. ISABU was producing an average of 13 tons of seeds until 2007 but has reduced it to only 5 tons in 2012. There is no active private sector that multiplies bean seeds. The public agricultural extension service – DPAE, is engaged in seed multiplication and distribution with support from FAO and NGOs. Farmers' associations and farmer groups are also involved in seed multiplication. Since there is no strong seed regulatory system, the quality of seed is compromised, affecting productivity and income.

Since 90 percent of the seeds used come from either from the local market or farm-saved, quality is not assured and will have an impact on yield, and access to varieties that are drought tolerant and disease resistant. Although there is effective demand for improved bean seed, farmers do only have limited disposable income to buy the seeds. One kilogram of bean seeds costs about 1500 Burundi francs. This may be the reason while international organizations and NGOs such as FAO and CRS are giving seeds free to farmers. Assuming 250,000 hectares of land for bean production and 40-50 kilograms per hectare of seeds, Burundi needs a total 10,000-12,500 tons of bean seeds. ISABU needs to increase the supply of pre-basic seed (now 5-7 tons) and DPAE has to intensify its seed multiplication effort to increase the amount of basic and commercial seed to a significant level - a level that would make a difference in yield, drought tolerance and disease resistance. The absence of a network of storage facilities and distribution outlets, along with effective extension services is compounding the problem of seeds in Burundi. ISABU is the only segment of the seed system that functions satisfactorily. The link between the pre-basic seed and basic and commercial seed is not strong and at times broken. The absence of monitoring, follow up and control leads to no traceability of the seeds which is paramount for any seed system.

Figure 4: ISABU Pre-Basic Seeds Produced, 2001-2010 (kg)



The Belgian assistance program helped develop a new seed law, including certification of producers. The system works only with Irish potato seed, and has not yet become active in bean seed multiplication. During and after the civil war (1993-2005) FAO sponsored seed fairs where any seed seller could participate. There have been farmer complaints about the quality of some commercial seed sales with respect to germination, impurities or even fake seeds, i.e., ordinary bean seeds sold as improved seeds. As of 2010 the FAO seed fairs were limited to seed multipliers that were working with the ISABU/FAO program. Currently, FAO has a policy that it would no longer supply seeds free to farmers, but instead farmers should source them themselves.

In principle, the government system was supposed to help farmers to obtain high yielding, drought tolerant and disease resistant seeds. The main task of multiplying and distribution of seeds was given to DPAEs – public extension services located in the provinces. Although DPAEs control some government land to be used for seed multiplication, they do not have the resources to multiply the seeds in an effective and timely manner. Seed production collaborators such as community groups, associations and farmer

groups are not given the right training and the resources needed to produce good quality seeds. Projects are also working in isolation from government control and monitoring, mainly control from the seed regulatory agency and from DPAE monitoring and guidance. Private sector and community efforts seem to be alternate seed multiplication and distribution mechanisms from the donor's point of view. But these two are still too weak to take over of DPAEs' role.

Inputs: Fertilizers

The majority of farmers do not use the type and amount of chemical fertilizer recommended. Chemical fertilizer recommended for beans is 100 kilograms per hectare. The recommendation for organic fertilizer (manure): is 10 tons per hectare. Total effective demand for chemical fertilizer on beans: 20,000-25,000 tons.

The Central Bank indicates that imported chemical fertilizer for all crops (including the export crops like coffee, tea, and cotton and sugar cane) increased gradually from 3,240 metric tons in 2007 to 10,114 metric tons in 2010. This figure is almost equivalent to coffee's needs alone. The Burundi government, with the assistance of the Netherlands is about to launch a new program for fertilizer imports, providing vouchers for fertilizer subsidies for food crops. The subsidy program intends to import up to 20,000 tons for food crops. This new system would seek to replace the government control of fertilizer imports and distribution by a network of private input suppliers – an ambitious undertaking that will take time and much effort to succeed.

NGOs working with bean farmers indicated that farmers in general don't know how much fertilizer they are supposed to apply on their beans, be it chemical or organic fertilizer. NGOs have indicated that most farmers don't apply fertilizer. Those few who do, apply less than what is recommended. One NGO said that fertilizer is rarely used in Muyinga province, whereas in Gitega it is more common, a report consistent with other information gathered on team field trips. The main reason is Gitega has been served well by the public's extension system over the years since the HQs of DPAE is located in Gitega.

Since climbing beans have been introduced recently, the use of fertilizer for this new crop is highly recommended and is being adopted by many farmers. Since it is planted with relatively pure seed, the effect of fertilizer is well demonstrated through increased yield when compared to the traditional common beans. The team believes that the use of fertilizer for climbing beans will increase as more regions and farmers adopt climbing beans and get more income. As to the use of manure, it will take a number of years until farmers re-stock cattle and integrate them into the farming system. It needs the effort of the Government and donors to bring back the cattle population to pre-war years and steadily increase it to bring about considerable change in the livelihoods of rural households.

Storage

Postharvest losses because of pest and disease are one of the major problems in the bean subsector. Storage losses are also mentioned as the second most important constraint. These two problems decrease bean production significantly resulting in reduced income to farmers. Because of a lack of proper storage facilities, farmers and small scale traders lose considerable volumes of beans because beans are highly

susceptible to damage including pests and diseases. The result is loss of income and profitability of the bean enterprise – be it at farm level or trading enterprise level.

Generally, it is quite difficult to store beans since they are easily and quickly attacked by pests. Beans are hit hard by pests when they are not dried completely, stored in humid storage facility, or in improper stores with no air circulation. The type of packing material also makes a difference.

In recent years, a few NGOs are helping farmers to store their produce. They help associations to develop joint storage facilities where farmers can store their products for a fee – paid in kind, 1 kilogram of beans per month for 100 kilograms of beans. NGOs insist the beans should be dried completely, spread out and fumigated under a tarpaulin to kill bugs, and put in 100 kilograms polypropylene sacks where they can be stored for several months. The chemicals to kill bugs in stored grain are available in Bujumbura. Traditionally some farmers use local methods such as ashes which are thought to discourage the insects. Farmers, associations as well as traders do not have moisture testing tools. Testing is done by biting into the grain. With no adequate storage facility, lack of moisture testing tool, and limited purchasing power to buy pesticides, Burundi beans would continue to be highly susceptible to pests resulting in significant postharvest losses and reduced income.

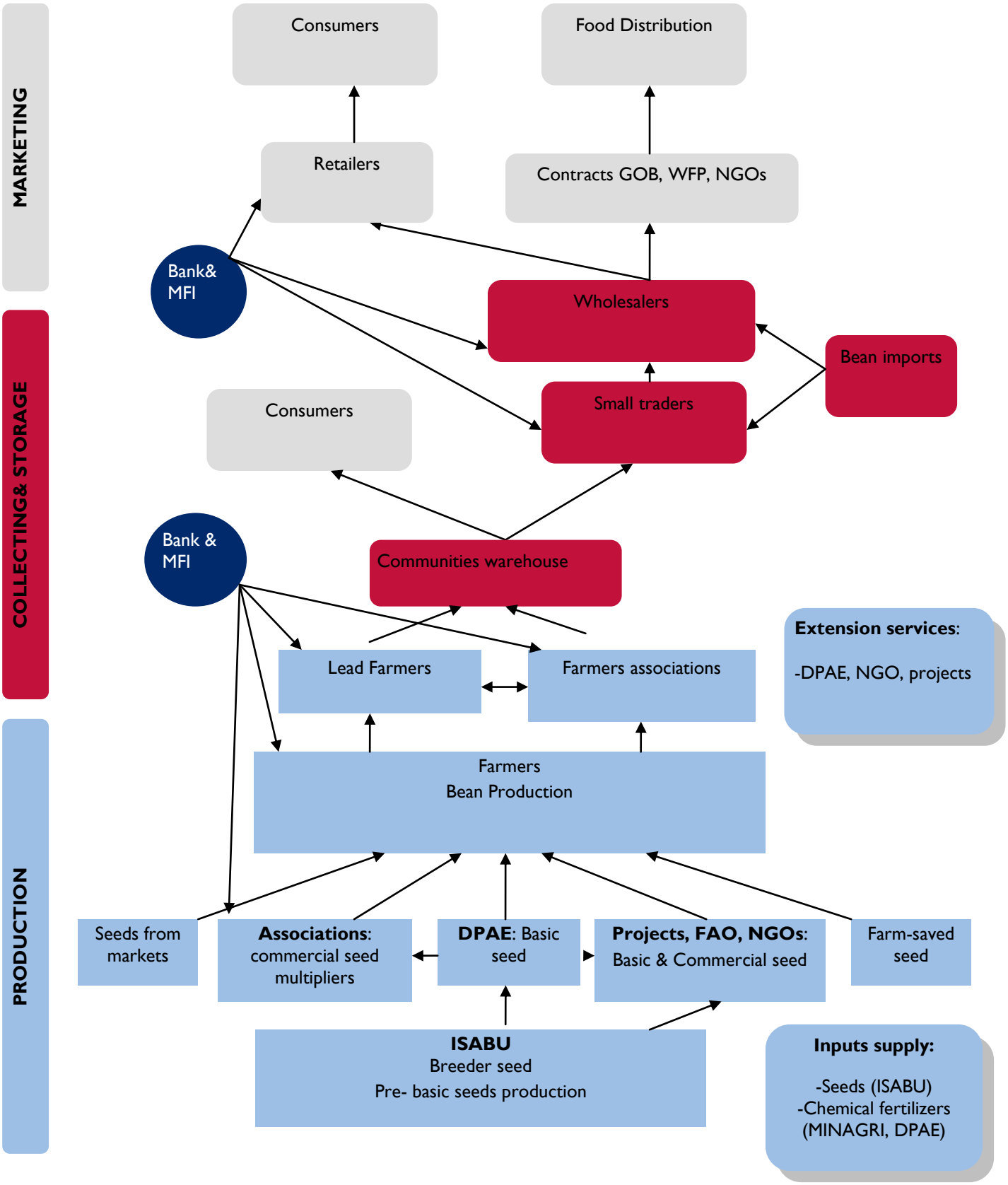
Marketing

The diagram below shows the major players and channels for bean inputs, production and marketing. Generally, beans are sold by farmers in local markets located within 3-5 kilometers of villages. The majority of the beans are bought by small traders who would store the beans and sell 2-3 months later at higher prices. These traders sell to consumers (including farmers) and to wholesale traders who would bid for big government, UN (WFP, FAO), and NGO contracts. Government contracts are mainly for government institutions such as the army, hospitals, prisons, etc. WFP contracts are for free food distribution for vulnerable communities while FAO mostly buys for seed distribution. Contracts with NGOs are for both seeds and food distribution to targeted population. Traders strongly complain about late payments by the government.

Demand

The domestic demand for beans is high. If they have the means, Burundians would eat beans every day. Since rural people do not have access to meat and dairy products, they look to beans as a rich source of protein. The problem is there are not enough beans to meet demand. A few traders are importing beans through mostly informal channels from Tanzania, Uganda, and Rwanda. A study shows that if production increased, consumption of beans would increase from 32 kilograms per person per year to 60 kilograms.

Figure 5: Burundi Legume/Bean Value Chain



Regionally, demand for beans is also strong since the same type and variety of beans are consumed in countries like Rwanda, Uganda, Tanzania, Kenya and DRC. Given the low level of production compared to its demand, Burundi's beans export is insignificant. There is small clandestine trade along the borders, mainly during harvest season. Since beans are consumed by practically all the population, the demand for beans would continue to exceed supply until considerable effort is made to increase productivity and acreage for beans.

Markets

At present there does not seem to be a problem of marketing beans across Burundi or across borders. The big market centers are Muyinga (mainly for beans from Tanzania), Gitega, Ngozi, Kirundo, Bujumbura, Makamba, Bubanza and Kayanza. It's Muyinga (mainly Giteranyi market) that supplies much of the beans for Bujumbura and institutional contracts.

Generally, local markets are not far from where farmers live. A 2010 PABRA/CIAT survey indicated that the most frequented local markets are within less than five kilometers on the average. A majority of farmers (mostly women) carry the produce and walk to the markets. A few men use bicycles. These markets are not only accessible to farmers but also to traders who come with pick-ups and trucks. The team found out that traders who have adequate and well managed storage facilities are doing good business in beans as demand for them never ceases.

Market Information

Lack of accurate and reliable market information is a major problem that Burundi farmers are facing. Except for information obtained from neighbors, farmers do not get consistent and reliable information. There is lack of government commitment to promote market information through its extension services. Farmers are forced to depend on brokers and traders who naturally bias the information to their benefit. If farmers do not have the right information at the right time, they do not know when to buy, to sell, and to store. In the process, they are losing their negotiation power hence losing a lot of income. Although farmers associations are supposed to obtain and provide market information, they are still too weak to process, analyze and disseminate information. Radio is the only channel through which some farmers would obtain information. It is the traders who have up to date market information and they are using it effectively. It's their power to gain the upper hand when trading beans. If the information the traders have is not available for farmers, it is the farmers who would have the weakest position to negotiate and will end up losing a lot of money.

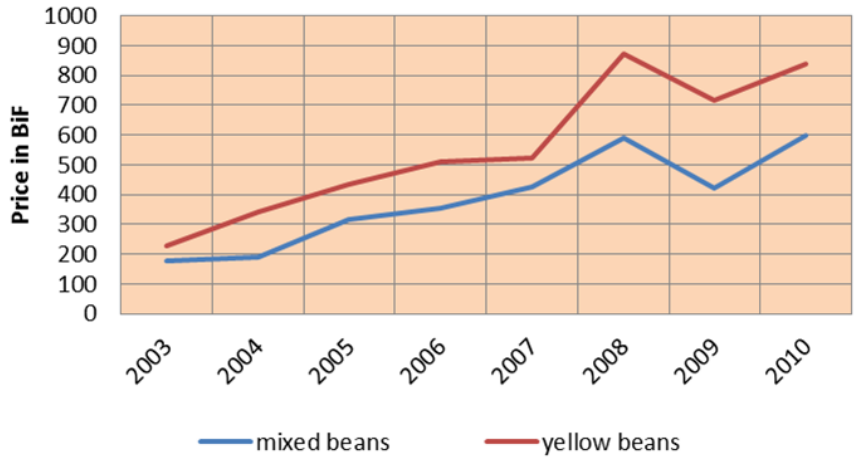
Some types of beans have higher prices than others (e.g. yellow beans are the highest priced and single variety beans – yellow, white or red – sell for more than mixed beans). There are moments when Rwanda and Tanzania restrict bean exports, though these periods are apparently brief. A large trader indicated that usually there is no problem in moving large trucks across the two borders with imported beans or more rarely with exported Burundian beans to Rwanda.

Prices

As demand increases in relation to supply, price increases. That is what is happening to bean prices in Burundi. Over the last two decades, production of beans has been decreasing while population has been

increasing at an average rate of 2.6-2.8 percent per year. The graph shown below demonstrates the trend in prices. Yellow bean prices have quadrupled in about seven years increasing from about 200 Burundi francs in 2003 to about 800 Burundi francs in 2010. The average price of mixed bean increased from about 200 Burundi francs to 600 Burundi francs for the same years.

Figure 6: Farmer Prices of Beans, 2003-2010

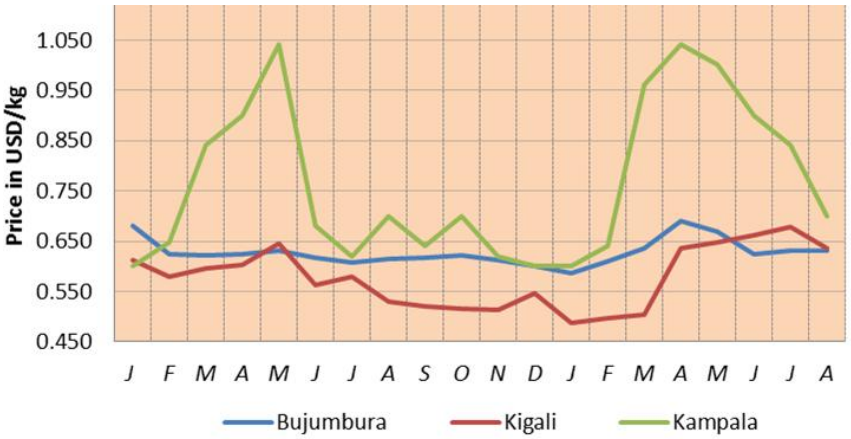


In general, mixed beans earn lower prices than pure (single color) beans. The price difference ranges from 25-40 percent more for single color bean. The most preferred bean is yellow bean which is produced in Kirundo. It sells up to 1,000 Burundi francs per kilogram during the off season. It averages to about 800 Burundi francs per kilogram for all seasons. In contrast, the price for mixed beans (multiple colors) ranges between 500-600 Burundi francs per kilogram.

The lowest price for beans is during and after the harvest season of Season B (June-August) – average of 650 Burundi francs per kilogram, while the highest price is during Season A – "hungry season" (Sept.-January) with a national average of about 850 Burundi francs per kilogram (PABRA-CIAT survey). The PABRA-CIAT survey also shows price differences among provinces. Muyinga Province has the lowest bean price while the highest price is recorded in Bubanza Province. Muyinga has an average price of 610 Burundi francs per kilogram while the average price in Bubanza is 920 Burundi francs per kilogram – a 33 percent increase from that of Muyinga. Because of the fact that Muyinga gets much of its beans from Tanzania, prices are lower than the rest of the provinces reflecting the importance of border trade in the region.

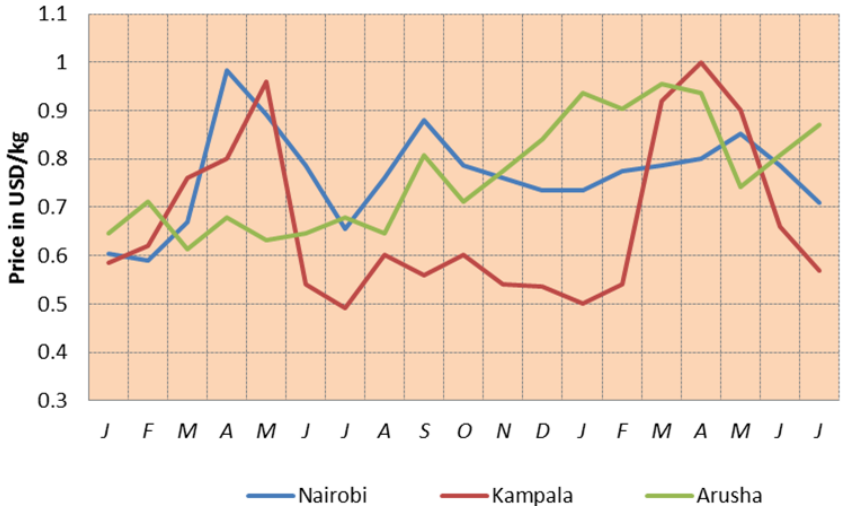
Regionally, prices have also been increasing Because of low productivity in beans and population increase. The retail prices show that Rwandan prices are generally lower than those in Burundi, but that in July Burundi prices are generally lower. This is the month just after the harvest of the main season (Season B). This is consistent with a report from a large trader in Bujumbura who said that in July he trucked beans from Burundi to Rwanda because Rwandan prices are higher than that of Burundi, but by October he was importing beans from Rwanda.

Figure 7: Bean Retail Prices in Bujumbura, Kigali and Kampala



Trading prices are more evident in wholesale prices. FEWSNET did not report wholesale prices for Burundi or Rwanda but the following are wholesale prices for some other major markets in the region. Ugandan beans are much cheaper than those in Tanzania and Kenya from June to February, but are as expensive as Kenya and Tanzania from March to May. Traders with good access to domestic and regional market information would benefit from trading within the region since they take advantage of significant price differences between the countries. Moreover, they can take advantage of fluctuations in foreign exchanges and devaluation of some currencies such as the Burundi franc whose value was reduced by more than 20 percent in 2012 alone. The devaluation would exacerbate retail market prices of beans which would have a negative impact on the diet and nutrition of rural and poor households.

Figure 8: Wholesale Prices in Nairobi, Kampala and Arusha, January 2001- July 2012



At present beans from Uganda, Rwanda and Tanzania supply food shortages in the commercial markets of Burundi. In the recent years, commercial bean imports averaged 10,000 tons according to the 2010 baseline study by the USAID COMPETE program. FAOSTAT data show officially registered imports falling to about 2,000 metric tons per year in 2009 and 2010 but some unofficial imports may not have been counted. Since much of the trade is done informally along the borders, it is difficult to have a good estimate of trade flows between these countries. What is true is that there is considerable trade in beans

throughout the EAC countries. The question is whether the trade is well organized and efficient, and the actors have the necessary capacity to advance the bean subsector.

Processing

There is no processing of beans in Burundi, though across the border in Rwanda there is a large canning facility for beans. The Burundian technology research group, CNTA, tried canning beans in glass jars but the jars were imported and expensive and there did not appear to be a viable market for them. This could change in the future, particularly since beans take three to four hours to cook and canned beans could eventually become attractive to urban working people. But at present, it does not seem to be an attractive market and it seems likely that given the dearth of reliable supplies and industrial products, costs of processing are likely to be high in Burundi. This may be an area of interest in future years, particularly after study of the results of the processing facility in Rwanda, which has a processing capacity of 60 metric tons per day for ready-to-eat beans.

There have been suggestions that much fuel could be saved if housewives soaked beans in advance to reduce cooking times, but this practice apparently has not been adopted since people say that the taste changes when it is soaked. It needs changes in the mind set of Burundians that there are alternative ways of cooking and eating beans.

Research and Development

Institute des Sciences Agronomiques du Burundi (ISABU) is in charge of the country's agricultural research working as semi-autonomous statutory body under the tutorship of the Ministry of Agriculture and Livestock. Established during the colonial days, ISABU was the single research institute that carried out the country's agricultural and livestock research with relatively good impact. However, its performance declined during the 1992-2005 war when research resources dried up, research infrastructures destroyed, and human resources displaced. In recent years, the Burundi government decided to increase ISABU's budget resulting in the revival of agricultural research. With help from regional R&D organizations such as CIAT (Centre International d'Agronomie Tropicale) and ASARECA (Association of Agricultural Research in East and Central Africa), ISABU is slowly back to a satisfactory level of a "small-size" research institute. The main problem that continues to be a big obstacle is the shortage of researchers and technicians that is common in all research departments and units. For example, there are only four researchers in the Bean Program covering the whole country. There are three researchers in Bujumbura supported by two technicians, and one researcher in Mosso covering the low altitude agro-ecology. There is still difficulty to recruit young researchers because of budgetary constraints and limited number of trained professionals who want to join a public research institute because of low salary and lack of incentives.

As to Bean research, ISABU is getting significant support from regional organizations such as the Pan African Bean Research Alliance (PABRA) that provides research and operational funding and technical backstopping. In addition, the East and Central African Bean Research Network (ECABRN) working under the coordination of ASARECA is providing competitive grants and operational funding. Recently, a Swedish entity called Bio Innovative is providing additional support to ISABU. Without these regional

organizations, ISABU would have been left with no research and operational funding to do any research at all.

With the funding it gets from the organizations mentioned above, ISABU's bean program is doing a number of basic, applied and adaptive studies in all agro-ecological zones of Burundi. The program is supported by its sister departments and units including Plant Protection, Plant Pathology, Soil Fertility, and pre-Extension. The following are some of the research areas, the Program is currently engaged in:

- Variety Selection
- Fertility application
- Disease control and IPM
- Technology transfer
- Nutrition (in collaboration with Ministry of Health)
- Gender (in collaboration with Ministry of National Solidarity and Family).

In terms of variety, ISABU is working on both hanging beans (*Haricot volubile)* and bush beans. The agro-ecological choice for hanging beans is mainly in high altitude zones where the performance is relatively high compared to that of low altitudes. In high altitudes, the yield is much better and the availability of staking material is relatively better. Hanging beans are mainly grown in a monoculture system while more than 70 percent of bush beans are mixed in with other crops mostly intercropped with tubers (sweet potato), banana and maize. Research results indicate that hanging beans are disease resistant when compared to bush beans and generate higher price since the varieties are not mixed – one color and mostly the popular yellow color. In lower altitudes, bush beans are grown mostly intercropped with other crops. Yield is relatively low, and varieties are generally mixed. In recent years, farmers have started to grow pure (one color) variety as new varieties become more accessible.

As the country's agricultural institution, ISABU is the sole producer of breeder and pre-foundation seed. Currently, it produces about 5 tons of bean seeds. Once it produces the seed, it distributes (sells) to different organizations who show interest of producing foundation and commercial seed. In recent years, ISABU's pre-foundation seed has been multiplied by DPAE (Direction Provinciale de l'Agriculture et Elevage), FAO, NGOs, projects and some private seed growers. The head of the Bean Program did not shy away to mention that the seeds produced by these different agents will have different levels of quality not meeting ISABU's standards as there is no seed regulatory agency who guides and controls the seed multiplication and distribution process. Despite a range of agencies involved in seed multiplication, only 10 percent of total bean seeds come from ISABU's source, while 90 percent comes from the market (70 percent) and farmer's stock (30 percent).

The head of the Bean Program mentioned that there are two key areas that need urgent support. The first and foremost is work on postharvest technologies since more than 40 percent of the country's beans is lost after harvest mainly Because of pests and diseases, poor handling and storing, and inferior packing materials. The second area is capacity development and strengthening of producers' and marketing associations and cooperatives so that transfer of technologies would be facilitated, and farmers would have a stronger negotiation capacity to get a reasonable price for their produce.

Bean Cost-Benefit Analysis

The cost-benefit analysis provides detailed information on the costs of bean production and the benefits derived from it. The following table presents bean production costs per hectare.

Table 4: Estimated Costs for 1 Hectare of Common Dry Beans in Muyinga, 2012

Contents	Unit	Unit price (USD)	Quantity	Total Cost (USD)	%
1. LAND					
Lease of land (land value)	ha	172,65	1	172,65	
Sub-total Cost of Land				**172,65**	**25**
2. INPUTS					
Seeds	kg	0,76	50	38	
Organic fertilizer	Ton	5,52	3	16,57	
Chemical fertilizer NPK	kg	0,83	100	83	
Fungicide	kg	1,52	4	6,08	
Insecticide	liter	13,81	1	13,81	
Sub-total cost of inputs				**157,46**	**22**
3. LABOR COSTS (Person Days)					
Plowing	Person day	0,83	100	83	
Fertilizer transport	Person day	0,83	17	14,09	
Sowing	Person day	0,83	60	49,72	
Spreading fertilizer & phyto products	Person day	0,83	6	4,97	
Weeding	Person day	0,83	55	45,58	
Harvesting	Person day	0,83	100	83	
drying, sorting, bagging	Person day	0,83	35	29,01	
Transport	Person day	0,83	30	24,86	
Sub-total Labor costs				**333,98**	**47**
4. OTHER COSTS					
Handling & Bag costs	Unit	0,55	60	33,15	
Sprayer rentals	Camp.	1,24	2	2,48	
agricultural materials	lot	4,14	1	4,14	
Sub-total other costs				**39,78**	**6**
Total Production Cost		**0,28**	**2500**	**703,73**	**100**

Source: Field data, September, 2012

The cost-benefit analysis took into account the following assumptions:

- The use of inputs and good agricultural practices improve yields from 0.85 tons per hectare to 2.5 tons per hectare
- The cost of labor is fixed at $0.83 per person day
- Production costs of the common beans are the same as those of the yellow bean.

The cost analysis shows the labor cost is the largest production cost with 47 percent of the total cost, while most farmers use family labor-unpaid. This situation may lead farmers to underestimate their cost of production and sell their products (beans) at too low a price. The following chart shows the composition of production costs – land, labor, inputs.

The cost of land is 25 percent of the total cost of production, which shows the importance of this factor in the production of dry beans. However, most farmers do not rent land; hence the indicated amount is the opportunity cost of land. The cost of inputs is 22 percent of the production cost. Because of weak purchasing power, the majority of farmers do not use recommended inputs.

Bean cost-benefit analysis

The bean cost-benefit analysis will consider the four possibilities for selling beans:

- **Bean sales in the field**: lack of access to credit and poverty push farmers who are in urgent need of cash to sell their harvest at a low price. In most cases, buyers are small traders from the same area. In this scenario the farmer more than covers the cost of purchased inputs but does not cover labor costs.
- **Local sale during the harvest period**: the sale of beans during the harvest period is at a loss when labor costs are included because bean prices are at their lowest point.
- **Local sale after storage**: local sale bean after storage one month or more allows the farmer to acquire a good price in the local market.
- **Bean sales in the Bujumbura market**: access to the lucrative market of Bujumbura is open to bean traders.

Table 5: Bean Selling Possibilities

Production cost	Contents	Unit	Quantity	Price unit	Total amount	Benefit
		Production	2500	**0.28**	**704**	
Bean selling possibilities	1. Beans sale in field	kg	2500	0.23	575	**-18%**
	2. Local sale during harvest period		2500	0.31	775	**10%**
	3. Beans sale after storage		2500	0.48	1200	**41%**
	4. Beans sale in Buja		2500			
	Transport	USD		104	104	
	Handling	USD		41	41	
	Marketing	USD		35	35	
	Total cost		**2500**	**0.35**	**884**	
	Sales value		**2500**	**0.6**	**1,381**	**49.0%**

Source: Field data, September 2012.

Among the various options presented above, the sale of standing crop is the worst option for the farmer, while the sale of beans after storage offers good prospects in the local market for the bean farmer.

The following table shows the same opportunities for yellow beans.

Table 6: Yellow Bean Selling Possibilities

Production cost	Contents	Unit	Quantity	Price unit	Total amount	Benefit
		Production	2500	**0.01**	**35**	
Yellow bean selling possibilities	1. Beans sale in field	kg	2500	0.29	725	3%
	2. Local during harvest period	kg	2500	0.34	850	21%
	3. Beans sale in Buja		2500	0.52	1300	46%
	Tansport	USD			104	
	Handling	USD			41	
	Marketing	USD			35	
	Total cost		2500	0.3	825	
	Sales value		**2500**	**0.6**	**1,503**	**53.1%**

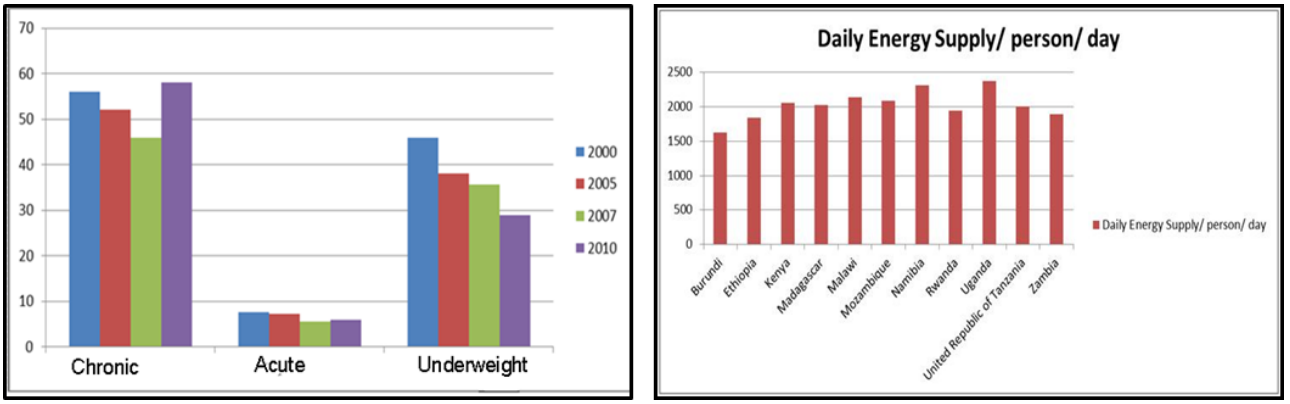
Source: Field data, September 2012.

Bean Consumption and Nutrition

The Burden of Malnutrition and Food Insecurity in Burundi

Since 2000, the country experienced a reduction in the prevalence of acute malnutrition which remains below the emergency threshold (10 percent), but underweight is still high (29 percent) near the critical threshold of 30 percent. Preliminary results from DHS 2010 showed that chronic malnutrition (stunting) remains a serious problem in the country, exceeding the critical threshold of 40 percent. More than 1 in 2 children in Burundi suffer from chronic malnutrition. No improvement of chronic malnutrition (stunting) since 1987. Burundi's rate of chronic malnutrition is 58 percent - one of the highest in Africa. Burundi's average food intake is less that 1600 kcal per person per day compared with the recommended standard of at least 2100 kcal. The average food intake for Sub-Saharan countries is more than 2000 kcal per person per day.

Figure 9: Malnutrition and Daily Energy Intake



UNICEF 2010: National Nutritional Survey (2000-2007), DHS (2010)

USAID Programs in Burundi Impacting Nutrition – Current and In-Process

USAID is active in Burundi with different programs with a nutrition component:

- A four-year (2009-2012) Title II Multi-Year Assistance Program (MYAP) managed by CRS, ending in August 2012. This MYAP works in three provinces, using a multi-sector approach

focused on food security. The MYAP nutrition activities included: 1) infant and child feeding practices, 2) development of kitchen gardens for dietary diversity and income generation, 3 nutrition and health behavior changes practices through care groups and the Positive Deviance Hearth methodology and training for health officials 4) promotion of appropriate hygiene and sanitation practices. The 2012 MYAP final evaluation found the greatest impact was on those participants who benefited from multiple activities and significant food security impact was achieved for approximately 15,000 households in the targeted watersheds, with 75,000 children and over 60,000 care givers benefitting from mother/child health and nutrition capacity building.

- Preventing Malnutrition in Children under Two Approach (PM2A) -- a five-year (2010- 2014) Title II MYAP managed by CRS called Tubaramure (Let's help them grow) in Kirundi. This program focuses on preventing malnutrition during the first 1,000 days. Tubaramure uses a three approaches to: 1) improve access to quality health services by women and children, 2) encourage households to practice appropriate health and nutrition behaviors, and 3) increase the intake of diverse foods, including supplementation with Title II commodities. The PM2A mid-term evaluation is in the process of being completed.

- A multi-year program, currently being designed by USAID/Burundi's Economic Growth Team, called Promoting Economic Growth (PEG). PEG foresees an impact on food security and household nutrition through the increased availability and accessibility of a more diverse diet of nutritious, higher quality foods. PEG will offer an opportunity to assess the value chains for coffee and legumes.

- Global Health Initiative (GHI) activities. USAID/Burundi is developing four GHI activities for the next five years: HIV/AIDS, malaria prevention, maternal and child health, and family planning. GHI's objective in Burundi is to reduce neonatal, child and maternal morbidity/mortality and reduce the incidence of major communicable diseases. USAID funds a range of GHI activities in Burundi, in support of Burundi government priorities in maternal, newborn and child health, reproductive health/family planning, malaria, nutrition and HIV/AIDS. Nutrition counseling is integrated into several USAID-funded activities, including programming for maternal and child health, malaria, and HIV/AIDS.

Bean Consumption and Nutrition

Beans are cultivated by nine out of 10 Burundian households (89 percent) and eaten at least five times per week by 70 percent of households. The main sources of beans for consumption are the household's own production (73 percent) and purchase (27 percent), according to WFP Country Food Security and Vulnerability Assessment of 2008. As is the case for many developing countries, postharvest farm management is still a major issue in Burundi. Significant bean losses happen at this stage resulting in reduced availability of beans for consumption and sale. Beans are among the first crops the in-home stock typically is finished before the next harvest. The majority of farmers involved in the production, harvesting, and marketing of beans are women. Because of their role in the household's nutrition, food preparation and caring for children's health and education, there is great potential to enhance food security, improve household nutrition, and increase incomes through bean value-chain program development.

Beans are rich in protein and essential micronutrients that will benefit populations of all ages. Nutrient dense dry beans are an important addition to the diet. They are low in fat, high in fiber as well as enhancing health-promoting aspects of the diet to reduce some chronic diseases. To date, the potential nutritional benefits of beans consumed locally or sold in the marketplace have been compromised by inadequate pre and postharvest handling techniques: late harvest that exposes beans to fungus, damage, and breakage during threshing; and high levels of insect infestation in beans stored in farmers' homes for consumption and later sold to the market.

In Burundi, there are no value-added bean products with relatively short preparation times, making bean preparation laborious with high fuel requirements. Some consumers may avoid bean preparation Because of long cooking time. However, techniques are available to reduce the cooking time. A strong community-based nutrition education and demonstration is needed to teach women and men how to prepare beans for consumption. Little information is available to- date regarding the prospects for increasing demand among consumers for processed beans. For example, bean flour has been tested in many countries and can be part of the balanced diet. Cultural bias has so far prevented mothers from preparing v a bean based diet for their children. This bias can only be dealt with education, information exchange, community-based preparation and taste, and inter departmental and ministerial coordination.

Some interventions new programs linked to nutrition may include:

- Increase community and households' bean production
- Implement food based community nutrition education and cooking demonstration to encourage the use of locally produced foods including beans
- Maximize the use of beans through improved food preservation and processing techniques, and make it accessible to vulnerable households.
- Collaborate with community health worker/agricultural extension agents promote nutrition and behavior change
- Work at national and local level to improve fortification techniques and access to fortified foods in areas with significant micronutrient deficiencies. Bean flour may add value to existing flour mix for good nutrition for young children.

Integrating Bean Value Chain and Nutrition

The proposed program will integrate agriculture and nutrition interventions through a value chain approach to nutrition. On the supply side, nutrition may be improved in two ways: 1) production of beans and other nutritious foods (vegetables) for the household; and 2) accessing markets and selling beans to generate income for the purchase of nutritious foods. The demand side may address critical access and utilization functions that contribute to improving the nutritional status of smallholder farming families, including intra-household food allocation, hygiene and sanitation behavior, feeding practices and food preparation.

A primary means of reaching households for both the agriculture and nutrition interventions would be working through community health workers, mother care groups and agriculture extension workers. The community based nutrition program is important to reach out to many people who share the same environment and challenge at village or hillside level.

The bean value chain component should focus and integrate vulnerable groups through literacy, life skills, and entrepreneurial training that will enable women and youth to take full advantage of the agricultural and nutrition interventions. Literacy, numeracy, and life and business skills training have transformational impact, especially for poor rural women. Burundi needs such a type of program with major area: 1) Literacy trainings which include basic literacy and numeracy, life skills, entrepreneurial literacy, bean agricultural productivity, nutrition education; 2) Business skills development; and 3) Capacity building of local organizations to deliver literacy training, business skill development and basic nutrition education using "train the trainer model". These interventions will enable vulnerable groups to engage in income generating activities, improve dietary habits and nutritional intake, enhance their business skills, establish or expand their enterprises, enhance entrepreneurship and marketing, and access savings and credit services available within their communities. These interventions will contribute to improved food security and nutrition in the vulnerable group. In addition, a critical component for Burundi is the climate change and natural resource management, agricultural practices which caused problems such as erosion, drought and famine in some area of Burundi. Improving capacity of agriculture extension workers, service providers, farmers, community health workers, mother care groups and health volunteers is important to improve the lives of vulnerable populations.

Gender

Role and Importance

Women play an important role in the production of beans in Burundi. They are primarily responsible for the production and post-harvest handling. Carrying their babies on the backs, they use archaic low-productivity cultivation such as long hoes on the hillsides and traditional methods in the lowlands, leading to a need to work harder and for longer hours with lower incomes. Nonetheless, the major challenge they are confronted with is access to land and to seeds – a result of weak regulatory system as well as weak distribution and marketing network. Farmers, particularly women, usually use some of the beans harvested from the previous season as seed.

Although women have their own traditional production and marketing practices for beans, many of them do not have full information on the best varieties, agronomic and postharvest practices. They are also limited by inadequate access to resources. Because of their low economic power, many women farmers are reluctant to pay high prices for improved seed varieties. Beans are normally grown for family consumption. Many women farmers may be particularly averse to investments that may require substantial amounts of cash, or entail marketing risk that they cannot fully assess. Women remain largely illiterate, with poor purchasing power, poor access to land and inputs including credit, and limited decision-making power.

The bean production process is comprised of a series of important social interactions among the family members and neighbors. All the rural families involved in agriculture allocate a plot for growing beans

for their own consumption. Once ripe, beans are collected, usually transported on the head by farmers (mainly women), and then bundled for drying. Families harvest the dry beans (if necessary, some of them are left to dry further) and processes them. In order to get the beans out of pods, men 'beat the beans'. Women then sort the beans out and the pods are stored for animal fodder for the dry season.

Beans have been (and will continue to be) the most important food staple and the most widely consumed legume in rural as well as urban areas. However, in the last few years the beans production in Burundi has decreased significantly due to both biotic factors, such as pests and diseases, and abiotic factors, such as climate change, soil infertility and insufficient rainfall. In fact, majority of beans are currently imported from Tanzania, Rwanda, and Uganda. A good source of protein and other nutrients as well as crucial part of diet and health of people living with HIV/AIDS, the shortage in the production has important repercussions on food security for a large number of Burundians.

Marketing Trends

Traditionally, beans were not considered a source of income for many famers, but today beans are the most marketable food commodity in Burundi. Most households, traders and women (90 percent) are involved in bean marketing. Beans are also traded informally across borders, as there is no strong government institution to control beans import. However, bean traders are confronted by a major marketing problem, namely a lack of information regarding market price variations, potential suppliers and buyers, new seeds, and agronomic issues As a result of this, women traders make minimal profit. According to a UNDP baseline study, most farmers (66 percent) sell part of their bean harvest at very low prices right after harvest. Other farmers (16 percent) need cash immediately and sell their harvest in advance. Only 6 percent of the farmers store beans to sell when prices are higher. It is important to note, nonetheless, that only 1 percent of rural families have an individual granary, the majority (90 percent) of households store the beans in the house; 7 percent share a collective granary.

Women are involved in small trade of beans and usually make decisions on how much to sell after harvest and on the use of the money earned from the sales. In recent years, men, have entering the bean chain, particularly as large traders because the demand for beans in Burundi and neighboring countries is increasing. Unlike men, women traders are confronted with a lack of capital to buy beans, and lack of facilities and information on how to keep them in good condition, and access the best market opportunities. The result is small profits for women involved in the sector discouraging other women to enter the bean trade. On the plus side, women often can use any profits from bean trade to buy essential needs for the family, without giving the earnings to their husbands.

Organization of the Sector

Contrary to the coffee sector, the beans sector in Burundi is not well structured as demonstrated by a weak regulatory and certifications system, a shortage in production materials and improved seeds as well as low levels of new technology and knowledge adoption by farmers. The coffee sector is defined by a large number of community based organizations and federations, all working towards addressing the sectoral challenges. The stakeholders also received training from BAP in organizational development, coffee quality control techniques, marketing, etc. as a result of which they now make higher profits, are

able to ensure traceability of specialty coffee and receive broader recognition for quality coffee production.

Poor women famers do not produce beans in an organized way, they have a limited capacity to control and manage their own production. On the hillsides some of them are members of associations. These are, nonetheless, in embryonic stage and not well structured. A women's group met in Ngozi stated that the members of the group work together to produce beans and share the yield among them post harvest. Depending on the season, each saves up to 20 kg for household consumption.

All the challenges and constraints, including the above mentioned weak institutions, low human capital and lack of investment in agricultural sector represent opportunities that can be harnessed to increase productivity. The SWOT analysis section of the report lists these opportunities

WORDS OF A WOMAN BEAN TRADER

Most of the businesses related to beans are family owned. During the assessment we met with two large beans traders in Bujumbura and Muyinga. One of them runs a business that plays an important role in bean marketing. She provides beans to the government for prisons and the army, non-governmental organizations such as FAO, WFP and the Red Cross. An earlier USAID effort called the Market Linkages program helped her address humidity problems in her warehouse and helped buy scales to link with thousands of mostly women farmers in Muyinga who are supplying her beans through their small farming organizations. When she wins a bid on a government tender, she indicated that she buys 25,000 metric tons at a time, transported in her 60,000 metric ton capacity truck and stored in her warehouses in Muyinga and Bujumbura for up to several months. She buys mixed beans from Burundi and Tanzanian traders who cross the border when local supplies are insufficient. She also said that she trades with bean seed supplying NGOs and farmer groups. She indicated that she is one of a number of large traders in Burundi who buys beans and other products. She borrows from banks at about 17 percent interest and may occasionally provide credit to smaller traders who supply her. Usually, she deals in cash. She buys from a cascade of small traders that may buy from small farmers with less than $100, selling to one or more levels of larger traders. She said most of the big traders are men. Her major problem is delayed payment by government institutions. Banks do not have mercy on their loans with compound interest piling up, and costs of marketing increasing every day.

Proposed Gender Program and Activities

- Clearly there are major opportunities to help women and other farmers to organize and increase their incomes with better varieties, better storage systems and better marketing systems enhanced by farmer associations or a federation of small farmer associations. In addition, it should be recognized that beans are a crucial part of a more complex farming and income system for the farm families that have major opportunities to address family nutrition issues and also to increase family income. The following is a list of some suggested activities that USAID/Burundi or other donors may undertake in future programming with respect to advancing the status of women and their families.

- When integrating a livestock program in agriculture there is potential to significantly increase the productivity of most crops including beans, using the manure for fertilizer and the animals also provide family income. For example, the decimation of livestock during the genocide affected soil fertility, given that before the war many farmers relied solely on manure for fertilizing (Thompson, 1999). After the genocide in Rwanda, the government put in place a program that aimed to provide One Cow per Poor Household. One of the objectives of the program was to promote dairy production to increase household income and improve stability through diversification of rural activities, such as intensive poultry and vegetable cultivation and small-businesses. Promoting smallholder dairy farming, which is overwhelmingly a female occupation,

helped empower women to generate more revenue to buy extra food, sustain crop production and improve the nutritional status of malnourished children and women in. Another good example is the Land O'Lakes approach to community development. Building on the success of their project (2007-11), Land O'Lakes and its partner African Breeders Services (ABS), under the Rwanda Dairy Competitiveness Program II (RDCP II) (2012-2017) will train and empower rural farmers including women farmers and people living with HIV/AIDS on best farming practices, to increase household incomes. For future programs, USAID may also consider integrating small ruminant projects in target zones. Women farmers could be encouraged to raise goats and chickens for income activities and for increasing their access to organic fertilizers for bean production. The beans leaves are good source of iron for pregnant women and children under five years old. Also the fodders of the beans are excellent to feed the animals.

- Burundi's high population density (about 300/ha) puts pressure on the land, so that crop rotation with beans and restoring/improving the soil structure through organic fertilizer can be important. For future programs, USAID should consider programs that integrate small ruminants' project in target zones. Women farmers could be encouraged to raise goats and chickens for income generation activities and for increasing their access to organic fertilizers to increase bean production. The beans leaves are a good source of iron for pregnant women and children under five years old. Also, the bean pods and other crop residues can be used as animal feed. In some of the most densely populated areas, goats may be easier to introduce and easier for farmers to handle than cows.

- In Burundi, women are not used to processing beans or soaking them before they cook them. Beans consume a lot of energy if they are prepared without pre-soaking. USAID, in future programs should:
  - Introduce new processing techniques of beans. Other opportunities might be to teach women to make bean flour and make different meals out of it. Such activities to change dietary habits may be considered on a small scale with a few adopters convincing their neighbors, but it may permit longer on farm storage of this essential food. As a good way to fortify malnourished diet some of the flour could be added to maize or sorghum or any other flour to make porridge for children. Many recipes for processed beans are available in Mali, West Africa.
  - Teach women new bean preservation techniques, particularly appropriate drying techniques prior to storage. On farm storage in clay pots may permit longer term storage than traditional storage methods and this has been promoted by some NGOs. Testing of moisture by traders at central buying stations (or perhaps by cooperatives supplying those stations) could also be desirable since some farmers may prefer to sell beans with high moisture because they weigh more. Cooperatives could collect single varieties for large traders, thus increasing the market value of the crop.

- The future USAID projects should consider integrating the Women's Empowerment in Agriculture Index (WEAI) into its agribusiness program targets to better measure the impact of investment on gender relations within households. WEAI is comprised of 10 indicators in 5 domains (5DE) - Production, Resources, Income, Leadership and Time - and allows identification of a woman's autonomy levels. A woman is defined as empowered if she accomplishes adequate progress in four of the domains

- Cash crop revenue disputes have been cited as a source of gender-based violence in rural

households. According to a study conducted by the FAO, the underlying causes and factors are related to poverty, economic inequalities and control over resources. Coffee is the main cash crop cultivated by almost every rural household in Burundi. The revenue is often collected and spent by the men, creating many disputes within the family. The FAO study also indicates that gender-based violence affects mostly productive population groups (age 15 to 45), and has a devastating impact on the agriculture sector and food security: illness (including HIV) and injuries resulting from the violence reduce work capacity, productivity and livelihood assets. USAID may consider training both men and women farmers by introducing new income-generating activities. Women can often start a small trading business without a large amount of money, so providing their organization with small grant or loan with a low interest rate may permit them to start a business, in storage, input supply other activities that may not be closely related to beans. "Women's Economic Funds" through their associations could be a start to empower women economically. Any such activities should also include addressing the issue of GBV related to control of money, in order to increase chances of sustainable success of those new businesses. This approach has been a great success in Mali.

- To reduce gender-based violence, USAID should develop strategies to support women farmers with consciousness awareness activities, working with local radio stations to broadcast key messages on gender based violence and with communities that inform women of their rights and also involve men in the education process. The radio programs (about 40 percent of rural families have radios) could provide guidance on remedial actions with zero tolerance for GBV. Schools could have children perform plays for the community that stress that women have rights and should be treated fairly, perhaps having them travel to neighboring communities to increase enthusiasm.

- These integrated new activities could be implemented through either a synergetic approach between the different USAID programs; or between USAID and other development partners in Burundi. CRS, for instance with its bean program funded by USAID's OFDA, targeted the 37 hillsides that were also the focus of USAID's Food for Peace Program. A wide range of donors and NGOs are active in beans and general agricultural programs. USAID should take the lead in reinforcing synergy of intervention within the donor community in order to effectively maximize resources for better program impacts.

- Increasing women's access to more economic opportunity is essential for their effective empowerment and to reduce the gender economic gap. With more income women can better participate in the decision making processes within their families and communities. USAID should partner with selected micro finance institutions (shared risk grant to WASI, CECM) to support women operating in the coffee and legume/bean sectors to help them increase their productivity and increase their income. This will require some capacity building of the MFI and then have them provide training and technical advice to the women. A low interest rate loan subsidized in the short term by a donor, with monitoring of the proceeds may be easier to control and more effective than grants. Ideally such programs should be planned so that they transition to sustainability without the donor within a few years.

- Grants Management: For grants management with USAID funds, there are substantial requirements that may be difficult to participants to meet. Even USAID officers with oversight may find it difficult to fully monitor and explain these complex requirements. USAID may wish to establish a relationship with a local accounting firm that can develop the expertise to advise grantees or potential grantees on requirements.

- Audits: A separate group, perhaps within the same Burundian organization, may be used to audit organizations receiving donor funds, help them establish proper financial management and controls that may lead to better governance within organizations and a longer term practice of good managerial practices including financial management. If necessary an international accounting firm could help to develop the capacity of the local accounting firm to provide these functions.

- Environmental issues: Studies have demonstrated that women play an important role in the management, restoration, and protection of natural resources because they are the first to suffer the effects of erosion and the lack of resources and poor hygiene in their immediate environment. Women spend long hours seeking fire wood for their cooking stoves and beans normally require three to four hours of cooking. For future programs, USAID should target women in developing natural resource management activities such as seeking better ways to obtain cooking fuel, , building mud stoves to save energy and also explore the promotion of soaking beans or other measures to reduce cooking time.

- USAID should work with a local NGO (CAFOB, Dushirehanwe) to reach out more women farmers and disseminate the cultivation of the climbing bean that is a higher yielding variety. Research has demonstrated that they can produce three times more than the bush types. Under the new program activities should focus on:

    - Help women to get better organized and revitalize their associations to be strong agricultural associations with defined goals and objectives. Provide them with capacity building in Agriculture technologies, leadership, business development, marketing, storage technique, etc.
    - Strengthen the capacity of women NGOs and local agricultural extension workers and the research sector to improve service delivery;
    - Improve bean production through better agronomic, IPM techniques, etc.;
    - Improve women's understanding of achieving food security and increase their incomes through bean production;
    - Introduce women both at the rural and sub-urban areas to new culinary techniques to improve the dietary habits of rural families. This can be reinforced by developing bean-based recipes, and quality based-seed production techniques written in Kirundi and could be used in the literacy centers and shared with the extension workers at the communal level.
- To increase private sector involvement in the beans value chain, USAID should build partnerships with private sector companies and organizations. The private sector may have different perceptions and sustainable activities for development of the production and marketing system. There may be opportunities to energize the private sector (both individuals and associations) through a matching grant mechanism (e.g. they contribute at least half) to develop innovative approaches to improving bean production, quality and marketing.

Partners

There are a number of international organizations that have been undertaking some modest and limited activities in the bean sector. FAO has been the most important and has supported the government to improve and multiply bean seed varieties since 2001. FAO has been working closely with ISABU, the research institute, and DPAE, the country's agricultural extension service. These public institutions have got a lot of support from FAO particularly in multiplying basic and commercial bean seed. A Belgian aid program, Cooperation Technique Belge (CTB) has also worked with the government to make seed policy

and regulation more effective. Recently, a law has passed that requires approval and certification of seed multipliers that use seeds originating only from ISABU.

Numerous donors have been involved in agricultural assistance, including the World Bank, the European Union, the Netherlands and Ireland. The Netherlands in particular are helping the government to institute a national fertilizer subsidy program to benefit food crop growers including bean farmers. UN agencies such as UNDP, UNICEF, and UNHCR are supporting vulnerable communities in the form of food distribution and small agricultural projects.

An IFAD-sponsored general agricultural development (PRODEFI) is engaged in a multi-year $73 million agricultural project including strengthening the seed system of Burundi's bean subsector. PRODEFI, like most other development agencies and NGOs has focused on improving agricultural production by working with farmers' associations that have been formed throughout the country within the last ten years.

In programs for seeds, production, storage and marketing of beans, International NGOs have been particularly important in seeds multiplication and distribution, and postharvest improvements including storage and marketing. All the NGOs met by the team indicated that they are slowly changing their philosophy of 'charity giving' to the one of 'helping farmers to produce more' hence reducing the dependency syndrome. The main question is how this help is coordinated and whether it is in harmony with the Burundi government's development strategy.

World Vision, building on a UNICEF initiative, is focusing on nutrition education – educating people (especially mothers) on the hillsides to identify severely malnourished children under 5 years old. The mothers are assisted to use their own resources (or sometimes helped by the community) to prepare a more nutritious food their children and their family need. Bean is one of the important ingredients for this program. Fathers are invited to attend a two-day training to learn the importance of nutrition and to persuade the family to amend their cropping and selling practices to provide adequate food for their family. World Vision said the number of severely malnourished children fell by 50 percent from 16 to 8 in one pilot hillside (village).

Other NGOs such as CRS, CARE, GIZ, Concern, and IFDC focus on community action to improve production and storage of food crops including beans. They all have limited resources and limited geographic areas of action. There is no coordination between and among them. CRS with an OFDA grant of $250,000 has been targeting 15,359 beneficiaries in four provinces on 37 hilltops, concentrating on bean storage, training and extension. It has also a program distributing 100 gram of seed varieties for testing on farmer's fields. GIZ provides support in the provision of inputs including seeds and chemicals (fertilizer and pesticides), and storage facilities. CONCERN is also involved in seed distribution although in limited scale. IFDC works with established farming groups to improve their overall management operations and help them to start new income generating activities (IGAs) and acquire small loans.

Among the local NGOs, INADES-Formation Burundi undertakes the lion's share of great support to Burundi in several activities including capacity building, entrepreneurship development, and provision of extension services. INADES has the resource capacity as well as the experience. It has a cadre of experts in all aspects of agricultural development. It has been in Burundi for over 30 years and it has proven to be

a reliable partner in development. It has been engaged in both food crops including beans, and the export crops including coffee.

The Confederation of Associations for Agricultural Producers for Development (CAPAD) has been in the forefront to support the country in the provision of inputs and extension services. CAPAD works throughout the country. Unlike INADES, CAPAD has limited resources but can perform well if provided the necessary resources and technical backstopping. It has a good network of partners and collaborators at rural level. It has also gained good reputation as a loyal and reliable partner. It has a good cadre of experts but limited in number.

Strengths, Weaknesses, Opportunities & Threats (SWOT)

Table 7: SWOT Analysis for the Bean Sector

Strengths	Weaknesses
• Beans are grown by 90 percent of rural farmers. • Climbing varieties can be adopted by farmers to double or triple yields over previous bush varieties. • Farmers often save seed for the next year or buy or borrow it from neighbors. • Beans can be harvested three times a year. When dried properly and treated with insecticide and stored properly they can be kept for three months or more. Thus they are an essential part of the household diet and available all year round, • The beans leaves are good sources of iron for pregnant women and children under five, HIV victims and others. The pods can be used for animal fodder – for small ruminants such as goats. • A network of small traders already exists to buy beans from farmers. A network of large traders with large trucks and warehouses also exists.	• Low yields – stagnant production level for beans • Although the government (ISABU) is producing improved bean seeds, the production and multiplication for sale to farmers are far below needs. • Farmers have difficulty to buy improved seeds for cash and may not be convinced that a new variety meets their needs without an on farm trial. • Many farmers complain that they cannot afford the expense of the poles (staking material) to support climbing beans. • Farmers lack fertilizers and cannot produce enough organic manure on their farms. There is an insufficient network of private input suppliers, partly because they cannot compete with subsidized fertilizer imports from the government. • The government's imports of chemical fertilizer are far below needs. • The prices for both chemical and organic fertilizers can be relatively high for poor farmers. • Bean production depends on rainfall. When the rainy season is bad farmers have bad harvests. • Although the government has an extension service, it is not effective in getting advice and help to bean farmers. • There is limited access to credit and when it is available, interest rates can be high (sometimes over 36 percent for microcredit – bank credit at 17 percent interest is generally not available to farmers. • Beans in storage are often attacked by insects (weevils etc.) and storage losses can be high. Inappropriate storage facilities, poor storage conditions (moisture) can failure to treat properly against insects can affect the quantity and value beans. • There is no bean processing in Burundi (unlike Rwanda which has a large canning factory). Processed beans could have substantial marketing difficulties Because of cost, price competitiveness and consumer preferences. • Unpredictable fluctuations in the prices and marketing opportunities are common. • Government policies in neighboring countries sometimes block export sales to Burundi, and changing competition from imported beans creates marketing uncertainties. • Inadequate and poor postharvest facilities including storage, markets, market information, feeder roads, and transport

Opportunities	Threats
• The biggest opportunity is for farmers to adopt climbing bean varieties and double or triple their yields. • Other opportunities are for farmers associations or groups of associations to cooperate with large traders to produce and market single variety beans, worth perhaps 40 percent more than mixed beans. • NGOs can work with farm groups to find cheaper or better alternatives to poles (bushes, strings, shorter poles, etc.). • Small farmers associations (sometimes in groups of 30 or so) have been forming over the past decade that can help with education, joint work to increase value added, education and improved marketing. • NGOs can help farmer organizations provide inputs to farmers • Properly treating and storing beans in warehouses for two or three months can result in a price of increase of perhaps 30 percent. Household storage in clay pots or using other techniques can reduce losses. • Warehouse receipts or other savings or credit systems can help farmers wait for higher prices that are typical after the main marketing season. • Some large traders have linkages to farmer supplier networks and help farmers market beans. • Burundi has a large deficit in production of beans and thus the market in Burundi and in neighboring countries can absorb any surplus the farmers are likely to produce. • Some provinces like Gitega, Muyinga and Karuzi have storage facilities for beans. • Beans can be a good source of income generation for women and they generally control the income received, using it for the family. • Some women have been organizing in small groups for cooperative production, marketing or credit activities. Other farmers' association is organizing to provide storage facilities, help with training on production, postharvest handling and marketing, and in providing input supplies including seeds, fertilizer and insecticides. Organized groups make it much easier to target small farmers and train them in agricultural techniques, processing techniques, nutrition, business skills development and marketing, organizational development and networking with similar groups or to develop new income generating activities. • Many of the women interviewed stated that they are renting small plots to grow vegetables and beans. They also buy beans from other small farmers to sell. • Single variety bean production and marketing (instead of mixed beans) can increase farmer sales value by about 40 percent. • Storage of beans in rural areas for two or three months can increase	• A major issue is access to land, particularly for women, who traditionally have low social status and traditionally must leave major decisions on use of farm and family resources to their husbands. • Beans can easily deteriorate if not dried and stored properly leading to huge losses for the farmer and/or the trader. • There have been reports of negative changes in rainfall (shorter seasons or more erratic) in some provinces, possibly Because of climate change. No farmer has the control of climatic hazards that can affect productivity. • Low production can cause a shortage of food and/or income and increase the level of malnutrition for poor families. • Some men, not fully realizing the importance of beans for their children's nutrition, may decide sell too much of their bean harvest, leaving the family to rely on cassava or other less nutritious food. • Uncertain market prices may make it unclear whether farmers can recover production, marketing, storage and credit costs particularly if they are unsure of yield increases likely from improved varieties and increased use of fertilizer.

farmer returns by about 30 percent. • FAO and other donors and NGOs have been working with the government to establish a more reliable network to produce and multiply more high quality seeds. • Small scale or large scale microfinance groups can help farmers get needed credit to buy inputs or to delay marketing of their crops while waiting for market prices to increase. There is tremendous need and opportunity to increase such activities by working with local associations and private entrepreneurs at the local level. • Because of the need for strong cooperation and trust, most of the positive changes will require working to develop the capacity of small local organizations organized on hillsides, and perhaps federating with other small groups with similar interests. • GOB and donor community's will to increase funding for agriculture	

ANNEXES

Annex I: List of Interviewees

Date	Institutions	Names	Responsibilities	Contacts
September 4	Bean Wholesaler in Muyinga	Nzeyimana Rosalie	ManagingDirector	79 927 124
September 9	CRS	Chomberg Debbrah	Representative	22214337
		Rubben Johnson	Deputy Representative	79 215 631
		Dr Ntiranyibagira Jeanne d'Arc	DCOP Tubaramure	79 483 011
		Tom Remington	By email	tom.remington@crs.org
		Nihoreho PacisRegine	Project Tubaramure Manager	79 207 949
September 10	WFP	BigayimpunziLilianne	Nutrition Expert	22 214 615
	PRONIANUT	Nkurunziza Jean Claude	Nutrition Program Manager Ministry of Health	77771873
	UNICEF	Muhimfura Bonaventure	Nutrition Specialist	22 202 000
September 12	World Vision	Dr Hatsindimana Bonaventure	Health and HIV Specialist	22215669
	GIZ	Baradandikanya Philippe	Expert in Income and Employment Support	78243293
September 13	FAO	Masuguru Apollinaire	Program Manager	22 206 007
		Salvator Kaboneka	Agricultural expert	
	WFP	Nzeyimana Christian	Program Manager	22214615
	CARE	Ndayiragije Remy	Food Security Program Officer	79 943 422
	Réseau Burundi 2000+	Charles Bigirindavyi	Country Director	79 923 143

Date	Institutions	Names	Responsibilities	Contacts
		Longin Nzeyimana	Provincial Manager	76 806 223
September 14	DPAE Muyinga	Evariste Hakizimana	Agricultural production service	79 458 419
	Kobero-Muyinga	Eliezer Bizimana	Bean Small Trader	78 775 274
	Ruzo-Giteranyi	Christian Nimbonera	Bean Small Trader	79 831 119
	Rugari-Muyinga	Aimable Niyonzima	Bean Small Trader	79 239 059
	Etablissement RWASA	Ndacayisaba Dieudonne	Managing Director	79 943 422
	ISABU GITEGA	Ntitegekwa Esperato	Conseiller au DGMAVA	22403651
September 17	CONCERN	Kabahungu Claver	Agronomist	71 481 782
	IFDC	De Groote Andre	Representative/ Project Coordinator	22 257 875
		Simbashizubwoba Cyriaque	Agronomist	22 257 875
	CNTA	Eric Nibogora	Administrative & Financial manager	78 852 907
		Bonaventure Nsanze	Deputy chief of Technical department	
September 19	ISABU BUJUMBURA	Ruratumana Capitoline	Agronomist	79 961 983
Additional interviewees.	MINAGRI	Joseph Nduwimana	Permanent Secretary	
	WFP	Bienvenu Djossa	Country Director	
	WFP	Gaston Nkeshimana	Nutritionist	

Annex II: Bibliography

1. CRS, Bean Storage Project (BSP), June 2012

2. FAO, Rapport de la Mission d'Appui Technique sur le programme semences de la FAO au Burundi, November 2011

3. FAO, Module de formation en éducation nutritionnelle, Bujumbura, Juin 2008, 18p.

4. FEWSNET, East Africa Price Bulletin, August 2012

5. Forum National sur la Sécurité Alimentaire et la Nutrition, Investir dans la sécurité alimentaire et la nutrition un préalable pour un développement durable, Juin 2012

6. INADES, Rapport d'activités 2011 : Accompagner les organisations des producteurs dans les filières de leur choix, Bujumbura, Mai 2012, 104p.

7. Integrated Food Security Phase Classification Phase (IPC), Note synthèse sur les résultats d analyse de l insécurité alimentaire aigue, August 2012

8. ISABU, Problématique de la production et la diffusion des semences de haricot, October 2003

9. ISTEEBU, Annuaire des statistiques agricoles, Année 2010. Bujumbura, Septembre 2011, 70p.

10. PARA-CIAT, Bean production and Marketing in Burundi Baseline Survey, Kampala, 2010

11. République du Burundi, MINAGRIE, Plan National de Sécurité alimentaire, section nutrition, Bujumbura, Juin 2008, 45p.

12. République du Burundi, MINAGRIE, Plan National d'Investissement Agricole (PNIA) 2012-2017, Juin 2011

13. République du Burundi, MINISANTE, Plan National de Développement Sanitaire 2011-2015, Nov. 2011

14. République du Burundi, Projet de la Politique Nationale de la Sante 2005-2015, Sept 2004

15. République du Rwanda, MINAGRI, Synthèse des Résultats des Etudes menées par le Food Security Research Project (FSRP) et l'initiative sur la Fertilité des sols de la FAO, February 2000

16. République du Burundi, MINAGRIE, évaluation des récoltes, des approvisionnements alimentaires et de la situation nutritionnelle, saison 2012 B, Bujumbura, août 2012, 42p.

17. République du Burundi, MINAGRIE, Etude des Marchés des Produits Agricoles, Diagnostic des services Financiers, Facilitation du ciblage & Elaboration des Plans de Développement des Filières prioritaires, Mars 2012

18. République du Burundi, Ministère de la Sante Publique et de la Lutte Contre le SIDA, Politique Nationale de Nutrition, Mars 2012

19. République du Burundi, MINECOFIN, Letter of Development Policy, October 2010

20. USAID, USAID Food for Peace Burundi Bellmont Estimation, April 2009

21. USAID/East Africa Regional, USAID provides Grants to improve Quality, Increase Farmer, Income and Market Integration in Burundi, March 2011, 87p.

22. USAID, Market linkages initiative evaluation report, Weidemann Associates Inc., September 2011, 98p.

23. USAID/CRS, Beans storage project, 3rd quarterly report, April 1st to june 30, 2012, 7p.

24. WFP, Comprehensive Food Security & Vulnerability Analysis (CFSVA) , December2008